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The East River Bridge.

THE first annual report of the Chief Engineer of this important structure is full of interest, and we give it entire, thinking it well worth the space it occupies. Mr. ROEBLING'S *resumé* of operations thus far, though not a remarkable specimen of clear and forcible English, gives good ground for confidence in his ability to conduct to a triumphant completion the work so carefully, though boldly, planned by his illustrious father. We have taken the liberty of altering the statement that "the average specific gravity of all the timber was forty-eight degrees per cubic foot," since it has no meaning and must be either a curious typographical blunder, or an equally curious error in authorship.

REPORT OF THE CHIEF ENGINEER.

JUNE 12, 1870.

To the Chairman of the Executive Committee, New York Bridge Company.

SIR:—Since the preliminary report of the late JOHN A. ROEBLING, made in September, 1867, no report has been published of the actual progress made of the construction of the East river bridge. I shall endeavor to present a very brief summary of the operations of the past year, a more extended one being impossible, owing to the short notice of preparation. A Board of seven Consulting Engineers had, during a series of eleven meetings held, April, 1869, substantially endorsed the general foundation plan, as well as the plans of superstructure, as presented by Mr. JOHN A. ROEBLING. The result of their deliberations was embodied in a report to the Bridge Company, written by Mr. HORATIO ALLEN, Chairman of that Board, and at present Consulting Engineer of the Bridge Company.

In May, 1869, a commission of

THE GOVERNMENT ENGINEERS

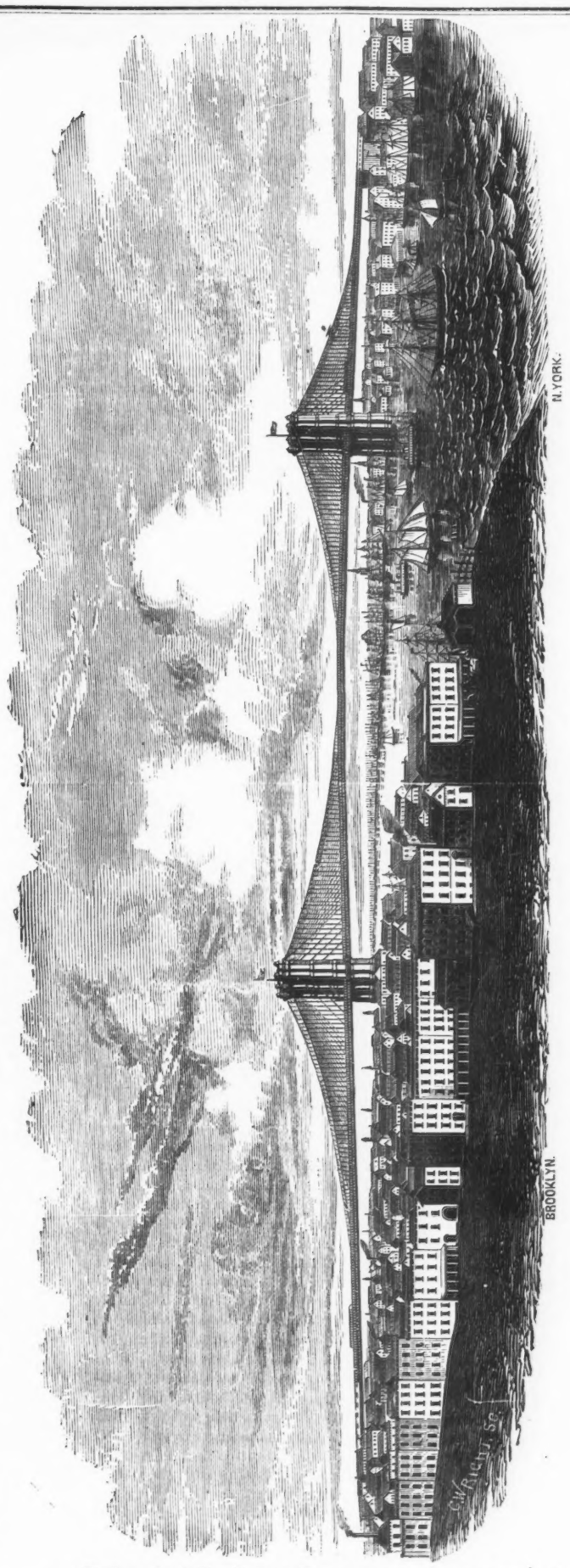
was appointed by the War Department, in compliance with an act of Congress, to report upon the East river bridge in regard to its being an obstruction to navigation, as well as upon the general feasibility of the project. These gentlemen recommended an increase of five feet in the elevation of the floor of the main span of the bridge, fixing it at one hundred and thirty-five feet above the mean high Spring tides, in the centre of the span. In order to avoid the increase in grade caused by this additional elevation, and also to save the increased amount of masonry in the towers and approaches, which would have entailed an extra expense of $300,000, it was determined to overcome it by making an entire change in the plan of the superstructure, throwing the trusses altogether above the floor, in place of partly above and partly below, as contemplated in the original plan. At the same time, the floor of the bridge was widened from eighty to eighty-five feet, to accommodate two double tracks for vehicles in place of the single tracks. The Government Commission also decided that on part of the permanent masonry of the towers above water should extend beyond the pier lines above the natural bed of the river. This necessitated an increase in the length of the main span of one thousand six hundred feet, to one thousand six hundred and sixteen feet from centre to centre of tower, and a length of each land span of nine hundred and forty feet. These additions in the length and breadth of the bridge necessarily demand a proportionate enlargement of the cables and other supporting parts.

SURVEYS.

The general line known as the Park route had before been determined, but no actual line had ever been located upon the ground, the bridge line having been simply traced upon the largest and best maps procurable of both cities.

WORK WAS COMMENCED

in June, 1869. One single air line run through over the tops of the houses from the City Hall, in New York, to St. Ann's Church, in Brooklyn, at once showed a discrepancy of more than fifteen feet between it and the line laid down on the maps. Several centre lines were run on trial, each one a little further to the east on the Brooklyn side and more to the west on Chatham street, New York, until one was found that was satisfactory. In the location of bridges some attention is paid to the difficulties likely to be incurred in getting foundations for piers, in making approaches, etc., but here such considerations had to be ignored, and the towers and anchorages placed wherever the exigencies of the case brought them. The Charter fixed the terminus on the Brooklyn side in the square on the corner of Sands and Fulton streets, etc., and on the New York side it was desirable to bring it as nearly as possible to the corner of Nassau and Chatham streets. The foundations of the Brooklyn tower threatened to encroach upon one of the main slips of the Fulton ferry unless kept far enough to the east; but by doing so the New York tower unavoidably occupied one of the slips of the Roosevelt street ferry. Any further movement to the east would bring the approach over Prospect street to a point where no head room was left between the grade of the street and the bridge crossing it. The same was true in regard to North William street.



THE EAST RIVER BRIDGE.

Other difficulties summed up showed that a change from a straight line was inadmissible, the centre line being established by a minute and detailed survey. Since then the Brooklyn foundation has been placed in its proper position on this line, and any change is impossible. In August, 1869, I was appointed Chief Engineer. At the first meeting of the Board of Directors, in September, 1869, the Executive Committee were empowered to proceed with the foundation of the Brooklyn tower, and to complete the same up to a high water mark. Mr. HORATIO ALLEN was appointed Consulting Engineer, and Mr. WM. C. KINGSLEY, General Superintendent. To Messrs. WEBB and BELL the contract to build the caisson was given.

THE BROOKLYN FOUNDATION.

In the meantime a boring made in 1867, showed gneiss rock at a depth of ninety-six feet below high water. The strata penetrated consisted in the first place of surface filling through alternate layers of hard pan and boulders of trap imbedded in sand clay. Below fifty and sixty feet depth the material was so compact that the bore hole stood without tubing for weeks. No necessity existed, therefore, for going down to rock; a depth of about fifty feet would suffice. But the great desideratum to be attained was a uniform character of the soil over the whole space of the foundation whatever the depth might be. It is well known that the drift formation of Long Island presents a great variety of strata in comparatively short diagonal distances. Within a hundred or two feet on either side of this foundation, there is no bottom, so to speak, and piles are driven a great depth into mud; whereas in the centre of our foundation the depth of water was only a few feet; the existing ferry slip had been blasted out at great expense, and to drive an iron shod pile even two feet into that material, was the work of hours. This hard material, however, occupied only a part of the foundation, which comprises an area of seventeen thousand square feet. One-third of the area towards the east was much softer in character. To meet the requirements of the case a heavy solid timber foundation was decided upon, of sufficient thickness to act as a beam, and leaving the requisite mass to ensure a uniform settling. The importance of a uniform foundation becomes evident at a glance, when we consider the size of the tower, weighing thirty-five thousand tons, with a height of three hundred feet above the foundation, upon which the permanent pressure is four and one-half tons per square foot. In addition, the buoyancy of the timber enables us to dispense with the scows ordinarily used in towing a caisson.

In regard to durability, it is well known that timber immersed in salt water is imperishable, and to protect it against worms it is merely necessary to sink it beneath the river bed. It at once suggested itself to make the timber platform as far as possible a part of the

CAISSON.

This has been done by making the roof of the caisson a solid mass of timber, of fifteen feet in thickness. The object and purposes of a caisson in sinking a pneumatic foundation are too well known to need any description here; it is merely a diving-bell on a vast scale. It may well be said that, since the unparalelled achievement of Captain EADS, at St. Louis, the word caisson has become a household word among American engineers. The caisson of the East river bridge is

a large inverted vessel or pan, resting bottom upwards, with strong sides. Into this air is forced, under a sufficient pressure to drive out the water. Entrance is had to the large working chamber, thus formed underneath, through suitable shafts and air-locks. The material is taken out through water shafts, open above and below, and two supply shafts send down the material subsequently needed for filling up the air chamber.

The dimensions of the caisson are rectangular: length, one hundred and sixty-eight feet; width, one hundred and two feet; height, nine feet six inches; thickness of roof, five feet. The sides form a V, and are nine feet thick where they join the roof, sloping down to a round edge. The inner slope of the V has an angle of forty-five degrees. The lowest part of the slope is formed by a semi-circular section casting, protected by a sheet of boiler-plate, which extends up three feet each side. A heavy oak sill rests on the casting, and it consists of a stick nearly two feet square. The three succeeding courses are laid lengthwise; after that the alternate courses are heading courses. The whole mass is thoroughly bolted together by drift bolts, screw bolts, and wood-screw bolts. In addition there are heavy angle irons uniting the V to the roof. At the corners the courses of timber are halved into each other, and strapped together for further security. The roof is composed of five courses of twelve-inch square yellow-pine sticks, laid close together, bolted sideways and vertically, and having a set of heavy bolts running through the five courses. The outer edge of the caisson has a batter inward of one in ten to facilitate its descent into the ground. To make the caisson air-tight, the seams were all thoroughly caulked for a depth of six inches, inside and out, and in addition a vast sheet of tin, unbroken throughout, extends over the whole caisson, between the fourth and fifth courses, and down the four sides to the shoe. The tin on the outside is further protected by a sheeting of yellow-pine. The space between the timbers was filled with hot pitch. As air under pressure of forty or fifty pounds will penetrate wood with ease, the inside of the air chamber was coated with an air-tight varnish, made of rosin, menhaden oil and Spanish brown. The air-tightness, up to the present time, is quite satisfactory, and only one-fifth of the air-pump on hand is sufficient to keep the water out.

The yellow-pine timber was selected specially for the purpose. It came principally from Georgia and Florida, and much of it was so pitchy that the sticks would not float. The average specific gravity of all the timber was 0.76, or 48 pounds per cubic foot. Every bolt hole is bored with a large drift to insure the hold of the bolts. As the construction of the caisson proceeded, the iron work of the water-shafts, air-lock shafts and supply-shafts was put in. This work was done under contract by Messrs. HUBBARD & WHITAKER, of Brooklyn.

The water-shafts, two in number, are square shafts, three-eighths boiler plate, properly stiffened by angle irons and well secured to the caisson. They are seven feet by six feet six inches, and are open above and below, the lower edge extending twenty inches below the edge of the shoe. The water inside of them rises and falls with the state of the tide outside. The material to be taken out is shoved under the edge into the water-shaft by the laborers inside, and is then taken out by the so-called clamshell dredge of MORRIS & CUMMINGS, of New York, the only known instrument which possesses the precise action of the human hand in picking up things. Any other arrangement for excavating, in the shape of a revolving dredge or a sand pump, was out of the question. The air-shafts are 3.6 feet in diameter, and extend simply through the timber on top of which the air-locks are placed. The supply-shafts are of two-inch timber, twenty-one inches diameter, and of indefinite length. They have a door at the bottom and one on the top with an equalizing pipe. They are filled full of made air, and the whole contents fall into the air chamber below.

It was the original intention to have made the air chamber under the caisson one entire space, without any division into compartments, thus facilitating the excavation of the material. Various considerations led to the abandonment of that view. Since the caisson was to be launched like a ship, a certain number of launching-ways were required, and these required a stiff frame from the launching-way up to the roof. Again, in the boulder soil, only a few points of the edge would have rested and supported the weight at any one time. But the chief point was the rise and fall of the tides, and their effect on the caisson. The extreme rise and fall is seven and a half feet. If the inflated caisson is just barely touching the ground at high water, it will press upon the base with a force of four thousand tons at low tide, all of which has to be met by the strength of the shoe and the frames. And it is not until the caisson is permanently righted down that the continuous excavation can take place inside. The frames are proportioned somewhat to the strains in launching, and form a heavy truss of pine posts and stringers with three-inch sheathing on each side, and side braces to the roof every six feet. The ends of the frames are secured to the sides of the V by knees.

It was concluded to limit the pressure of the caisson during the launch to two and one-fourth tons per square foot of launching surface. This required seven ways in all, two under the edges and five under the frames. The total launching weight of the caisson was three thousand tons, containing one hundred and eleven thousand cubic feet of timber and two hundred and fifty tons of iron. It was launched sideways, that is, with the long face of one hundred and sixty-eight feet by fourteen feet six inches high facing the water. The ground-ways we laid at an angle of one inch per foot, the caisson standing fifty feet back from the end of the ways. To buoy up the forward end of the caisson as it entered the water, and thus prevent its entire immersion, a temporary water-tight compartment of two-inch plank was put in, one-third the distance across. It served its purpose admirably. A full complement of wheelbarrows, crabs and winches were likewise stowed away in it. The ground-ways consisted of two timbers, eleven inches square each, bolted together sideways. They were grooved like the guide of a planer, and the upper launching-way fitted their grooves correspondingly. The great danger of launching so large a mass on seven ways consists in the liability of one end going faster than the other, and thus wedging the caisson fast on the ways. Only the outer ways were provided with rib-bands. They, however, proved superfluous to accelerate the motion of the caisson as it entered the water, and thus overcome the increasing resistance. The ways were laid crowning to the amount of eighteen inches in their length. The launching-ways were likewise continued ten feet back of the caisson, and provided with shoes against the sides, as it was desirable that the rear edge of the caisson should leave the edge of the ground-ways uniformly, and not stick fast on one—a thing likely to occur, since the ways stopped at the lower water line, and the rear edge would fall at once into deep water. The above arrangement answered the purpose.

On the 19th of March, 1870, the launch took place—in every respect a success. As soon as the last block was split out, the caisson commenced to move. The impetus it had acquired in the first part of its course proved sufficient to overcome the immense resistance offered by the water. It would seem that, if the ways had been about twenty feet longer, the caisson would have lost its headway. The air caught inside the air-chamber aided materially in buoying up during the launch. Neither the battering-rams provided to start her, nor the checks and levers intended to hold her back until the proper time, were needed. The deck of the caisson was not submerged, nor was there any wave of translation in front, as might have been expected. An air-pump and boiler had been placed on the caisson before launching. This was at once set in motion, and in a few hours the water was all displaced from the air-chamber, the air blowing out at one corner, thus proving a satisfactory state of tightness. When the air was afterwards allowed to escape entirely, the top of the caisson settled within seventeen inches of the water, which happened to agree with previous calculations.

The launching arrangements, as well as the entire responsibility of the launch, rested with the builders, and they accomplished their results by simple, common-sense arrangements, no money being wasted on elaborate precautions or preparations.

PREPARATIONS OF SITE.

It had been estimated that the same length of time would be required to prepare the bed for the caisson as to build it. Owing to unforeseen difficulties, possession of the ground was not obtained until January 1, 1870. The winter had hitherto been mild, and continued so, much to our advantage, as during most winters it would have been impossible to do anything. The preparation of the site consisted in establishing a rectangular basin, open towards the water side, surrounded on three sides by a wall of sheet piling, levelled off to a uniform depth of eighteen feet at high water. This depth was decided upon because one corner of the site had that depth of water already, and because a certain depth was necessary to float in the caisson at all stages of the tide. The dismantling of the space—the ferry-slip—drawing a hundred piles, tearing out of three hundred and fifty feet of fender sheathing, removing of three hundred and fifty feet of heavy cribbing, filled with stone, and dredging of the loose material on top, required in all about a month. The dredging was done by Mr. TEBO, by day's work, two machines of the OSGOOD patent being used. The drawing of the piles was done partly by pile-drivers and in part by the "OX," a steam crane-boat, well adapted for the purpose. At the same time, it became necessary to cut away half of the pier separating the foundation from the main slip of the Fulton ferry, which was accomplished without interfering with the ferry. All the timber and piles taken out were found to be infested with thousands of sea-worms; the ravages, however, were confined to the space between low water and the mud line. A pile, which was sixteen inches in diameter below the mud, perfectly sound, and free from worms, would be found eaten away to a thin stem of three inches just above the mud, and all timber was affected alike. This shows the necessity of going below the top of the river bed with our timber foundation, and also proves its entire safety in that position.

MATERIAL REMOVED.

In all, there were ten thousand seven hundred yards of material removed, the bulk of it in the course of a month, comprising the filling in and surface mud. A line of soundings, then taken, showed three thousand yards yet to be removed, before the level of eighteen feet was reached. The character of this material was next to solid rock; some of the dredges could make but the slightest impression upon it, neither the OSGOOD nor the powerful grapnel of MORRIS & CUMMINGS. All of the old charts of the harbor showed this point to be a reef of rocks, or boulders, and these had been covered by filling in from the shore. Recourse was necessarily had to powder. Surface blasts were not used at all, because the locality forbade the use of heavy charges, which are essential for success. A surface charge of less than three hundred pounds would have been of no effect. It was determined to make holes in the bottom, by means of an iron pile driven in, and afterwards withdrawn. Into the bottom of this hole, say four or five feet deep, a canister, containing fifteen to twenty pounds of powder, was inserted, when the pile-driver was hauled back, and the charge exploded by electricity. The result was a small crater, and the loosening of contiguous boulders from their bed. Three iron piles were used, two of five inches and one of six inches, twenty-two feet long, and shod with steel at the point and head. Two pile-drivers were coupled together for this work, and a double gang of laborers employed day and night, under charge of Captain SCOTT. A week's practice reduced the matter to a system, and developed the kind of canister to be used, the exploders, and the battery. From the ordinary tin canister we passed to second-hand lap-welded wrought-iron tubes, cut in lengths of two feet, and plugged at each end, which proved effective, but the supply getting scarce, recourse was had to cast-iron shell, with sides half an inch thick. They possessed the additional advantage of dropping to the bottom of the hole of their own weight. The average number of blasts made by one gang in ten hours was thirty-five. The greatest delay was experienced in withdrawing the pile, which frequently resisted the united efforts of both pile-drivers hauling on treble blocks with their engines, and a thorough shaking did more good than any amount of steady strain.

THE BATTERY

used was a small frictional machine, enclosed in a light rubber case, and was supplied from the Oriental Foundry, of Boston, as were the exploders. This machine was instantaneous in its effects, and never out of order, and with it any number of charges could be set off at the same time. After a thorough blasting, the OSGOOD dredge could work to advantage for a short time. Many of the boulders were too large to be picked up by a dredge, and a few were taken out by the MORRIS & CUMMINGS grapnel, while others were slung under water by divers, having first been loosened by blasting, and then lifted by the drivers.

Those that were too heavy, were floated along under water to a space back of the foundation, and there dropped. The whole process was expensive, but still very effective. The casual observer, to whom the surface of the water appeared the same, day by day, would think that nothing was done, but the diver, who slung boulder upon boulder night after night, had a different story to tell.

This driving of iron piles afforded a thorough knowledge of the entire ground. On the side towards MARSTON and TONUS, a dozen blows would drive the pile down forty feet through soft clay, where it was brought up by a harder stratum. But in the centre there is a ridge-shaped layer of hardpan, varying from two feet to eight feet in thickness. Frequently the blows of the fifteen hundred-pound hammer were required to drive the pile three feet into this material. Towards the ferry, the clay again disappeared, giving way to boulders of all sizes, packed close together, a coarse sand filling up the spaces between. On the river side, all sand or clay was washed away, leaving the bare stone.

As the time passed along all work was confined to the lines of the frames and edges of the caisson, leaving the ridges between, to be removed afterward from under the caisson. Three-fourths of the boulders consisted of the trap-rock of the Palisades, the rest gneiss, with a few sporadic boulders of red sandstone. Holes of extra depth were blasted for the location of the water-shafts. In the south shaft the pile finally penetrated through eight feet of hard-pan, and then struck into loose sand.

None of the dredges were adapted for such work. The bucket should have been discarded entirely and replaced by one long, plough-shaped tooth, fastened to the dipper handle, solely with a view of rooting up the material. The ordinary dipper presents too much surface for penetration.

The cost of dredging out the soft material on top was about sixty cens per yard, and of the hard material below, including the blasting, three dollars and sixty-two cents per yard.

One thousand one hundred and seventy-three blasts were fired, consuming thirteen thousand pounds of powder.

While the dredging was going on the enclosure also proceeded. An outer row of piles was first driven and fastened back to anchors and logs in order to resist the pressure of twenty-two feet of earth. Five feet inside of this a line of close sheet piling was placed, with sufficient marginal space for towing in the caisson.

During April, six air-compressing machines were placed on their foundations, and satisfactorily tested. They were manufactured by the Burleigh Rock Drill Company, of Fitchburg, Mass. Each engine is twenty horse power, and drives two single acting air cylinders of fourteen inch stroke and fifteen-inch diameter. Every engine has its own boiler, and they are all so connected that the stoppage of no one boiler or engine will affect the rest.

A large condensing vessel serves to precipitate the moisture in the compressed air and deliver dry air into the caisson. A ten-inch main leads the air underground a distance of one hundred and fifty feet to the caisson, where it branches, and two rubber hose of six inches diameter lead the air to the supply-shafts, and thus into the caisson. Self-acting check valves prevent the escape of the air in case anything should happen to the hose. All the air-conductors have been tested to a safe limit. A blacksmith and carpenter's shop have been erected, the fires being blown by compressed air. One compressor has been set apart to compress air to sixty-five degrees for the purpose of working two Burleigh rock drills in the caisson.

Two double engines have been set up by MORRIS & CUMMINGS to work the dredges in the water shaft, and two more engines are ready to hoist and set stone on the caisson by means of three large derricks with horizontal booms, yet to be placed on the caisson.

On the first of May the levelling off had proceeded far enough to bring down the caisson from Greenpoint. A contract had been entered into in the meantime with WEBB & BELL to lay the ten additional courses of yellow pine timber, and advantage was taken by them of the delay to put on two of the courses at Greenpoint, where the caisson was lying afloat.

THE CAISSON WAS TOWED DOWN

by six tug-boats, under charge of Captain MAGINN. The pump was kept in operation, and the air-chamber fully inflated, the great buoyancy possessed by the V shaped sides prevented any tilting or loss of air. This inflation was essential, as in one part of the river there was only a foot space between the bottom and the lower edge of the caisson. At the turn of the

tide, the following day, the caisson was easily hauled into place.

A double row of piles encloses it on the outside, and also supports the track and turn-tables for the stone cars.

By June 20th all the courses of timber were laid. The courses cross each other at right angles, with spaces between of four and five inches—every two feet four inches the stick is fastened down by a one-inch drift bolt. The whole mass is thus bound together into one solid, unyielding platform. Each course was properly adzed off, and the original course of two sills with which the frames were laid is still preserved. The amount of timber laid in five weeks amounts to over 100,000 cubic feet. The space between the timbers is filled in with concrete, which serves to add to the necessary weight as well as to harden and preserve the timber.

It is composed of four parts of clean-washed beach gravel from the Sound, two of sand, and one of cement. The gravel is small, uniform in size, and perfectly free from impurities. Various brands of cement have been used so far, comprising, in addition to the Rosendale cements, the yellow cements from Coplay, Penn., Akron and Fayetteville, N. Y. The latter are all quick-setting, but do not attain the ultimate hardness of the slower setting Rosendale cement, especially where the latter has been ground of extra fineness by special agreement.

As the timber was built up the covers were slipped back and the outer spaces filled in with concrete, so that at its upper corner there is a mass of concrete from four to five feet thick, which serves to protect the timber.

The additional sections of water shaft, as well as the air-locks, were put up; in the meantime permanent air connection was established. The air-locks are seven feet high, and six feet six draw inside; the sides are half-inch boiler-plate, and heads of cast iron, with oval doors, eighteen by twenty-two inches; six bull's eyes light up the interior.

These locks, as well as the sections of water shaft, were made by the Morgan Iron Works, and are very creditable specimens of workmanship.

To avoid the lengthening out of the air shafts the air locks are placed within water-tight compartments, which occupy the spaces of the well-holes in the towers, and will keep out the water when the top of the timber is submerged.

The air chamber was first entered May 10th through the air locks, and gradually, as the caisson settled more, the force of laboring men has been increased.

The removal of the temporary wooden compartment and shoving out of the material under the edges was accomplished in due time, as well as the opening of two doorways through each of the frames.

For three weeks past a gang of forty men has been at work in the caisson, for eight hours every day, under charge of Mr. Young, principally in levelling off and removing boulders which happened to lie under the frames and edges. A deposit of dock mud, from two to three feet deep, has made this work exceptionally unpleasant. The dredges, which are now beginning to work, will remove it in a short time. The removal of large stone from under the shoe, some of them containing one hundred cubic feet, is a matter requiring considerable skill and perseverance. It has so far been accomplished by means of blocks and falls, crabs and winches, and hydraulic pulling jacks. In extreme cases blasting will be resorted to. During this time the caisson has daily

BEEN RISING

with every high tide, and settling on the ground again at low water, requiring most of the work inside to be done at low water, when the caisson is comparatively free from water. As the edge does not readily sink into the hard soil, it is expected that there will always be some water. Since the edge of the shoe is rounding, it allows the air to blow off before the level of the water has reached the lowest limit; this is caused by any trifling agitation in the level of the water inside which gives the escaping air a chance to establish an outgoing current before the head of water becomes sufficiently great inside to overcome it.

By constantly building up on top, the centre of gravity has been raised considerably, and the caisson is now in a condition of unstable equilibrium—that is, it does no longer rise uniformly with the rise of the tide. One end will remain on the ground, and the other rises as much more in proportion, and the more it rises the more surface it presents to the upward pressure of the air on that side, the general level of the water inside being governed by the level of the highest point of the shore.

This rising of one end of the caisson is attended by another phenomenon of imposing appearance. As the tide rises, and the downward pressure of the caisson is about being overcome by the increased tension of the air inside, as well as the buoyancy of the water outside, one end of the caisson will suddenly rise six inches or more. The result is that for a few minutes the tension of the air inside exceeds the head of water outside, and a tremendous outward rush of air takes place under the shoe, carrying along a column of water of hundreds of tons to a height of sixty feet at times. This continues until a return wave inside of the caisson checks it. These blow-offs are not felt to any extent by the men inside, beyond the warning noise and momentary draft created.

The magazine of force contained in 170,000 cubic feet of compressed air is so large that the loss of a few hundred tons is a trifle. A system of pipes is put in the air-chamber for the purpose of illuminating the air-chamber by calcium lights, a trial of which has resulted favorably; with moderate pressure candles answer very well.

THE FIRST COURSE OF STONE

is now being laid. Its weight, together with the concrete on top of the timber, will probably suffice to ground the caisson permanently, and thus permit the erection of setting derricks on the caisson. The stone-setting will then keep uniform pace with the excavation, and by the time the desired point is reached, the masonry will be far above the water level.

The stone used for these land-courses, which will be permanently under water, is the Kingston limestone, furnished by NOON and MADDEN. These stones have both beds cut, but the sides and butts left rough with vertical quarry joints, the projections not exceeding two and a half inches. The beds are exceptionally wide. As the base of the masonry work resting on the timber is very much larger than the section of masonry at the water level, it is considered that this class of masonry is equally as good, and certainly far cheaper than regular dimension stone. All the stones in any one course are cut to a uniform rise. Above low water granite will be used on the water face, and subsequently throughout as freestone. [?]

LAYING THE FOUNDATION STONE THIS AFTERNOON.

The first or corner stone of the extensive pile of masonry to be raised above the caisson, unlike as it was to ordinary affairs of this kind, was a massive block of limestone from the quarry at Kingston, Ulster county, and in extent was three feet wide by eight in length, weighing about five thousand eight hundred pounds, or one hundred and sixty-five pounds to the cubic foot; and it is of this material that the foundation below low water mark will consist.

Additional borings are now being made for the New York tower. The boring made two years since was four hundred feet away from the actual site of the tower. This one is directly on it. The same stratum of thirty feet of the finest quicksand has been penetrated, but boulders have been encountered at a depth of eighty feet, and the indications are that rock will shortly be reached.

Plans have been perfected for the New York caisson. It is somewhat larger than the Brooklyn caisson. Owing to the greater depth to which it is necessary to go, and the greater pressure of air to be encountered, it will be lined with boiler-plate inside; otherwise it is constructed of wood.

Other means beside the water-shaft will be provided for the removal of the fine quicksand. Successful experiments to that effect have been made by Mr. ALLEN and Mr. COLLINGWOOD, during the summer. The depth of water varying from thirty-five to forty feet, at the site of that pier, the management of the caisson during its descent will be somewhat different, and a slight change in the frames and floor will be made.

To Mr. C. C. MARTIN, formerly chief engineer of Prospect Park, and now engineer of construction on the caisson, as well as to Col. PAINE in superintending the building of the caisson and the excavation inside, I am under continued obligations. Also to Mr. COLLINGWOOD, in charge of the designing room, and to Messrs. VON DER BOSCH and HILDENBRAND, draughtsmen.

Respectfully submitted,

W. A. ROEBLING, Chief Eng. N. Y. Bridge Co.

Genetic Relations between Pozzuolana, Trass, and Santorin Earth.

Translated from "Die Hydraulischen Mörtel," of DR. W. MICHAELIS.
By ADOLPH OTT.

III.

IT is scarcely necessary to point out again that brick-powder is the oldest artificial pozzuolana. The Romans used it for the preparation of mortar for masonry exposed to moisture wherever they had no volcanic sand at their disposition. RAUCORT DE CHARLEVILLE and TREUSSART occupied themselves, both at about the same time, with investigations concerning hydraulic mortars, and confirmed also the hydraulic properties of certain burned clays.

Slags, ashes of lignites and ordinary coal, as well as iron scale, was then employed with varying, but, in general, with less success, evidently because the nature of these materials is highly variable, and often directly contrary to the end in view.

To quote an instance: There are only certain slags that can be of benefit for this purpose, to wit, such as have a composition approaching that of the natural pozzuolanas. To these belong most blast-furnace slags, while basic slags, singulo, and subsilicates, must be, on the other hand, nearly without effect.

Experience has demonstrated that slags of a proper composition, (50 to 60 per cent. silica, and 15 to 20 per cent. alumina), are not inferior to the best pozzuolana.

To the pozzuolanas belong, furthermore—the arènes and psammites of the French; the former being strongly aluminous varieties of sand, very possibly corresponding with *arenis fossilis* of VITRUVIUS. VICAT says that they are employed, since the olden times, by the mill proprietors at the tributaries of the Loire, between Nevers and Briare, and at the river Isle, in the Department de la Dordogne. Concerning the psammites, it was found that they are decomposed primary alum slates, which have also met with a manifold use, since, in 1824, the civil engineer AVRIL employed them in the Department Finistère, with good success, instead of pozzuolana, after calcining them for ten hours in a lime-kiln.

Later (in 1833), when BERGRATH FUCHS made us better acquainted with the nature of hydraulic mortars, the fact became known that opal, flint and soluble glass are excellent hydraulifactors. Yet practice has as yet drawn very little benefit from these materials, although the very abundant occurrence of flint, for instance, should apparently make it worthy of notice. To this we shall recur in the sequel.

The intimate relation which the volcanic tufas generally bear to the pyroxenic rocks, may already be considered as a cause that they should also be capable of hardening under water when mixed with lime.

Trials which have been made in this direction by SCHUBLER, with the trachytes, basalts and trap-tufas of Würtemburg, proved in fact, that many of them possess this property in proportion to their solubility in acids; the more they are acted upon by these, the more nearly they approach Santorin-earth, trass and pozzuolana.

Exposure to glowing heat approaching vitrification is generally very serviceable for this purpose. According to VICAT, burned gneiss of the following composition has been used since 1820 in the harbor of Brest, as a substitute for Roman pozzuolana:

Silica	60.33	Magnesia	} 6.92	
Alumina	21.43	Potassa		
Oxide of iron	8.57	Soda		
Hygr. Water	2.75	Lime		

Thus we see that the following materials have been employed as pozzuolanas, namely: Volcanic tufas, pyroxenic rocks, burned alum-slate, (psammites) calcined clays, brick powder, volcanic sand, (arènes) ashes and slags.

The Chemical Character of Pozzuolanas.—If we review more closely all the substances that have successfully been used for the preparation of hydraulic mortars, we find their chief ingredient to be silica. Alumina and oxide of iron follow in the second place, while the monoxides of lime, magnesia and the alkalies take part in their constitution, but in a very small proportion.

We find, moreover, that they are all more or less alterable by fluid agencies, that they contain a considerable portion of their silicic acid in the so-called soluble (readily combinable) modification, that alumina and oxide of iron are often contained in them in a hydrated state, or otherwise in a somewhat loose chemical combination, and, in fine, that water generally forms one of its constituents.

We have also seen that some are more effective as hydraulifactors, the more completely they are decomposible by acids, and in judging of their hydraulic properties we deem ourselves therefore justified, in considering their behavior in this respect as the governing principle.

If we then find, as the analyses here appended show, that trass and Italian pozzuolanas are soluble to about two-thirds in strong muriatic or sulphuric acid, Santorin-earth to one-third, clays fit for use, to from one-sixth to one-fourth; if we see, furthermore, that clay and aluminous slate, which in their unbrowned state are quite indifferent towards hydrate of lime, and are scarcely attacked by acids, while they are, when burned, not inconsiderably affected by fluid agencies, and capable of setting with hydrate of lime to cement, we are certainly entitled to regard the facility of decomposition in the wet way as a chief criterion in considering the question, whether a silicate be suitable for use as a pozzuolana.

ANALYSES OF POZZOULANAS.

		1	2	3	4	5	6	7	8	9
Soluble portion.	Silica	11.500	5.15	29.5	3.0	10.248	10.250	19.5	21.0	28.2
	Alumina	17.700	16.0	5	10.5	9.008	2.055	8.7	10.7	2.0
	Oxide of iron (Ox. mang'se)	—	3.33	3.9	6.1	4.760	4.565	6.3	6.8	21.8
		11.772	0.65	—	—	—	—	—	—	—
	Lime	3.156	1.25	6.5	3.0	1.90	1.585	8.6	1.5	9.9
	Magnesia	2.140	0.81	1.1	0.7	—		0.9	1.1	—
	Potassa	0.294	3.50	6.4	10.0	1.50	1.500	2.6	3.0	1.2
	Soda	2.450	2.17				1.471			
	Water	7.656	2.65	12.6	7.7			10.2	12.4	4.1
Insol. portion.	Silica	37.438	47.93	28.0	33.0	48.806	49.564	52.	33.5	25.0
	Alumina	1.350	2.26	5.0	6.0	12.272	13.790	8.1	8.2	6.7
	Oxide of iron	0.573	0.48	—	—	—	—	—	—	—
	Lime	2.251	—	1.2	1.0	—	—	1.2	1.3	1.3
	Magnesia	0.272	0.50	—	—	—		—	—	—
	Potassa	0.077	0.65	—	—	2.87	12.65	—	—	—
	Soda	1.119	1.27	—	—	6.232		—	—	—

1. Trass from the Rhine. (ELSNER).
2. Trass from the Brohl valley. (HERFELDT'S quarry. VOHL.)
3. and 4 Trass from the Rhine. (From Holland. RIVOT.)
5. Italian pozzuolana. (ELSNER, STENGEL.) } Calculated for the anhydrous state.
6. Italian pozzuolana. (ELSNER, REICHARDT.) }
7. Italian pozzuolana. (RIVOT.)
8. Pozzuolana from the Department l'Hérault. (RIVOT.)
9. Pozzuolana from the Avergne Montagne Gravenaire. (RIVOT.)

The chemical decomposibility and the deportment of a silicate towards acids and lyes, will, therefore, allow us to draw at once, and with great probability, a safe conclusion, whether the same might be suitable for the end in view or not.

From our Special Correspondent.

The Twin City Slate Company.

THE quarry of the Twin City Slate Company is situated near the village of Calmet Port, in Northampton County, Pa.

The first opening in this quarry was made by OWEN WILLIAMS, C. W. GAREY and others, in the Spring of 1866; and the quarry, although not owned by a chartered company, called the "Central Lehigh Slate Co."

But little was done towards developing this quarry, until the fall of 1866, when the property passed into the hands of J. D. EMACK, J. N. SHALLENBERGER and J. S. NEWMEYER, of Pittsburgh, who rapidly pushed the improvements on the quarry. In January, 1867, Mr. EMACK retiring from the partnership, the remaining partners formed an incorporated company, under the title of The Twin City Slate Co.

There are two veins of slate running through this quarry, with an average strike of N. 55° E.; and are being worked on the upward turn or wave of the rock.

The front bed, which is now being worked, is about sixty feet below the surface, and has a length of one hundred and fifty feet, and an average split of twenty-seven feet.

On top of the second vein, and nearer the surface, are two small beds, each of five feet in the split; below which, however, is a solid bed of thirty feet in the split.

This quarry contains nothing but roofing slate, and that of good quality, although harder to work than slate from some of the neighboring quarries.

There are at present about twenty-five men employed in the quarry, and the average production of slate is about fifteen squares per day.

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf.

MARKET REVIEW.

The Coal Trade.

NEW YORK, June 23, 1870.

WHOLESALE.—There has been a great deal of coal sold in this market during the past week in a very quiet way, and Lehigh coal of all sizes is quoted as scarce, but the larger sizes, for furnace use, particularly in short supply. We are happy to see dealers thus coming in the market, and securing a portion of their supply. It is the best policy to pursue. June is passing quickly from us. July is late to be looking out for a supply, and the chances are that the first advance made in prices will bring a flood of buyers to the market—of course, all wanting to be supplied at once. Schuylkill county is sending a fair amount of coal forward—in fact, two-thirds of her usual supply; so we calculate that, whether all her collieries resume or not, it will make but little difference, one way or the other. We notice considerable of Lackawanna and Pittston coal piled up in their store-yards. What does this mean—if not waiting for an advance in prices? We should buy coal now. The chances for a decline are very slim, while an advance is without doubt.

The eighty-fourth Scranton sale is announced in our columns for Wednesday next, June 29; 80,000 tons will be sold. The attendance at the June sales has always been large in years heretofore, and the prices obtained have generally been the key-note for fall operations. As the market appears to-day, it looks very much as though an advance of 10 to 15 cents per ton, compared with last month, would be obtained. The large steamship companies and manufacturers who use these coals extensively, will be on hand, and many retailers will start their fall purchases at this sale. For these reasons, we apprehend a firm market and good prices.

The opinion in the market regarding prices is much divided. The large companies all pretend to be bearing the market, thinking that low prices will pay well enough, providing they can keep Schuylkill out, and sell an increased product. They all acknowledge to be doing a big business at small profits. This may be the case, as they would like to have the public understand it. We think, however, that they desire to hold the trade in check until it is too late for our friends in Schuylkill to resume this year, and then, having a free market to themselves, reap a rich harvest. We shall see!

RETAIL.—Families are buying more freely, and a fair trade is doing. Many are laying in their winter coal, prices ranging from $6 to $7 50, which certainly is low enough, provided people are willing that all hands engaged in the mining, transporting and retailing of coal shall have a fair living.

FREIGHTS.—Show a slight advance to some points, under an unusual demand. Vessels are, however, yet in good supply, and we do not apprehend any extra advance in rates just now.

ITEMS.

A select party of about one hundred and fifty, representing our leading houses in the Coal Trade, enjoyed, on Thursday week, a Moonlight Excursion up the Hudson River. The moon failed to show forth through the dense clouds, and consequently all was black as *coal*. By the aid of coal oil, however, we were enabled to "trip the *light* fantastic toe," and do justice to a plentiful supply of eatables. Mr. E. H. WILDER, of the Wilkesbarre Coal and Iron Company, was the grand mogul of the affair, and to whom the guests of the occasion are under great obligation. The The whole affair was very *recherche* and respectable, one to be remembered a long time by those whose happy lot it was to participate. Mr. SAWARD, the respected Editor of the *Circular*, was there, and on the sly enjoyed himself muchly. The party returned to New York in time to go to the Post Office next morning.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 18, 1870, compared with week ending June 19, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R	75,498	1,281.331	30,725	1,068,398
Schuylkill Canal		1-3.0-4	2,765	39,114
Lehigh Valley R. R.	6,330	957,5 8	48.849	1,489.141
Lehigh & Sus. R R.	737	302,2-2	20,882	452,723
Lehigh Canal	592	174,62-	12,107	153,101
Scranton North	1,26	2-6.2 4	15,189	302,58-
" South	1,852	592.258	35,477	824,427
Penn. Coal Co., rail	27,2-2	4,0.574	24,675	507,533
" " " canal	596	6,050	6.0	6,212
Del. & Hud. Canal Co.	39,258	475.9 0	51.416	546,123
" " R. R.	73	9-,187	5,819	230,5-3
" " south	2,542	46,582	10,039	192 65-
Shamokin	2,27-	143 44	8,087	146 089
Trevorton	2,828	40,7-7	2,441	38 9-9
Lykens Valley Coal Co.	2,252	25,514	3,739	35,652
Wyoming South				
P. N. Y. C. & R. R. Co.			2,894	13\,177
Williamstown, Col'y.	2,934	59.628	7,153	126,415
Short Mountain	1,456	21,562		
Total	82,351	5,005,971	292,887	6 2-5,584
1869			166,848	5,005.971
Increase week and year			126,039	1,279,613

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 18, 1870, compared with week ending June 19, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
B. & O. R. R.	18,945	412.111	18,506	371 803
C. & O. Canal	18,583	233,432	17,604	194 859
H. & B. T. R. R.	9,256	155,269	6.642	140.918
Harrisburg & D.			15,692	359 920
L. V. R R.		552		6,622
P. & N.Y. C. & R. Co.				
	46,784	771,364	58,444	1,074,122

Schuylkill Coal Trade.

Report of Coal transported via the P. and R. R. for the week ending June 16, 1870—less coal carried for Company's use, and Bituminous Coal:

For week	30,725 08
Previously this year	1,028,672 16
Total	1,059,398 04
Same time last year	1,251,531 00
Decrease	192,932 16
Amount sent same week 1869	79,498 00

Amount of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, June 16, 1870:

From St. Clair	
" Port Carbon	3,416 04
" Pottsville	369 02
" Schuylkill Haven	15,053 02
" Auburn	1,127 11
" Norristown	
" Port Clinton	9,253 19
" Allentown and Alburtis	1 535 10
" Harrisburgh and Dauphin	15,052 13
Total paying freight	46,418 01
Coal for Company's use	2,051 08
Total for week	48 469 09
Previously this year	1.374,2-1 07
Total	1,422,730 16
To same time last year	1,487,489 14

Report of coal transported over the Schuylkill Canal for the week ending Thursday, June 16, 1870.

	Tons. Cwt.
From Port Carbon	587 00
" Pottsville	185 09
" Schuylkill Haven	1,544 00
" Port Clinton	449 03
Total for week	2,765 00
Previously this year	36,.49 14
Total	39,114 14
To same time last year	183,044 15

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, June 18, 1870.

	WEEK.	SEASON.
North	44,374 03	1,053 522 10
South	10,098 12	192 657 07
Total	54,472 15	1,246,179 17
Corresponding time in 1869.		
North	....	704 772 04
South	2,842 08	44,876 00
Total	2,842 08	749,648 04
Increase North	44,374 03	Increase348,759 06
Increase South	7,256 04	Increase147,7-1 07
Total Increase	51.630 07	Increase496,431 13

Report of Coal Transported over Lehigh Valley Railroad

For the week ending June 18, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREV'LY. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	8,424 01	324,183 08	332,607 09
" Hazleton	42,841 01	9.5 4-8 04	978,-24 1-
" Upper Lehigh	542 04	6,260 18	6,803 02
" Beaver Meadow	13,609 05	322,366 16	335,975 09
" Mahanoy	2,403 27	116,639 1-	119,043 15
" Mauch Chunk		447 17	447 17
Total Anthracite	67,820 06	1,705,387 01	1,773,207 07
Bituminous Coal recv'd from Cata. R. R.			
N. C. R. R.			
E. P. R. R.		6,622 00	6,622 00
P. & N. Y. C. & R. R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	67,820 06	1,712,009 01	1,779,829 07
Same time last year	6,896 01	1,07-,5-9 06	1,077,-95 07
Increase	60,924 05	640,592 13	702,334 00
Decrease			
Forwarded East from M'h Chunk by rail	48,849 15	1,440,292 04	1,489,141 19
Same time last year	6,330 12	9-1 1-8 04	957 513 16
Increase	42,519 03	489,104 00	531.6-3 03
Decrease			

RECAPITULATION.

Forwarded East from M'h Chunk by rail	48,849 15	1,440,292 04	1,489,141 19
To N. C. R. R., at Mount Carmel		115 00	115 00
Forwarded North from L. & B. Junction	2,894 19	132,282 06	135,177 05
To L. & S. R. R. at Packerton for rail	44 18	3,986 11	4,031 09
Delivered at M'h Chunk	32 18	6-1 19	684 07
Delivered on line of road above Mauch Chunk	124 10	6,882 09	7,006 19
Delivered above M. Chunk for use of L. V. R.R.	724 10	27,718 13	28,443 03
To L. & S. R.R., at P'n Hav., for railroad			
Do. for canal	19 728 01	62,173 02	72,8-1 06
At M.Chunk for canal	4,421 02	31,334 17	35,755 18
Total Anthracite	67,820 06	1,705,387 01	1,773,207 07
Bituminous Coal		6,622 00	6 6-2 00
Total all kinds	67,820 06	1,712,009 01	1,779,829 07

Shipments of Cumberland Coal

for the week ending Saturday, June 18, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M.	.....	.....	.....
Borden	1,272 08	2,590 12	3,863 00
Consolidation	3.666 15	7,614 12	11,281 07
Spring Hill	321 07	.....	321 07
Midlothian	2-6 03	86 09	342 12
H. and Baltimore	....	1,026 03	1,02- 03
do Va M	1,205 15	.....	1,205 15
V C & I Co	592 18	.....	592 18
G. C. C. and I.	2,389 18	678 18	3,068 16
Maryland	2,298 01	5,304 05	7 602 06
American	1,997 00	4,292 09	6,289 09
Atlantic	341 12	.....	331 12
Piedmont	700 00	.....	700 00
Swanton	1,239 15	.....	1,239 15
Barton	756 00	.....	756 00
Potomac	1,582 00	.....	1,582 00
Franklin	2,675 12	.....	2,675 12
Big Vein	1,447 10	.....	1,447 10
Total week	22 732 14	21 593 08	44 326 02
Previous	383,126 06	212,513 12	595 640 01
Total year	405,859 00	234,107 03	639,966 03

Statement of coal transported over the Cumberland and Pennsylvania Railroad during the week ending Saturday, June 18, and during the year 1870, compared with the corresponding period of 1869:

WEEK.

YEAR.	C. & O. CANAL. Tons. Cwt	B. & O. R. R. Tons. Cwt	TOTAL. Tons. Cwt.
1870	17,604 19	18,506 17	36,111 16
1869	18,583 17	21,945 04	40,529 01
Increase			
Decrease	978 18	3.438 07	4,417 05

YEAR.

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1870	194 859 16	371,803 18	566,663 08
1869	203,-32 0-	412,111 07	615,5-3 09
Increase			
Decrease	8,572 15	40,307 09	48,880 01

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending June 18, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct	WEEK, 1869. tons ct	YEAR 1870. tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	2848- 13	922 19	512-11 14	257085 16
Upper Lehigh Region	4285 05		57453 11	56577 19
Mahanoy Region	97 03		292 04	8-8 01
Hazleton Region	10821 16	65 14	76-60 12	52706 14
Beaver Meadow Region	4650 13	363 11	35-74 02	24166 01
Mauch Chunk Region		196 19	30089 18	119056 10
Totals	48345 07	1549 03	713502 01	510481 01
Increase	46.96 04		2-3021 03	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	20882 19	737 07	452723 04	302282 00
Forwarded East of Mch Chunk by Canal	22107 15	592 18	153101 18	174626 14
Delivered at and above Mauch Chunk	849 10	218 18	18538 05	14783 18
Delivered to L. & B. R. R.at Plymouth Bridge	4505 03		89138 14	13688 03
L. V. R. R. at Sugar N.				5.00 03
Totals	48345 07	1549 03	713502 01	510421 01
Of the above there was from Mines controlled by Co., W. R.C. & I.Co	14335 01	859 07	219795 11	125003 14
L. C. & N. Co		196 19	46743 15	132568 17
Totals	14335 01	1056 06	266539 06	257572 11
Increase	13.98 15		8966 15	
Decrease				

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending June 16, 1870:

	Tons.
For week	15,982 13
Previously this year	344 2.7 17
Total	359,920 10

Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, June 24 R. A.	W. A.	AT PHILADELPHIA, June 23. R. A.	W. A.
Lump	$- —	$5 00	4 50	- -
Steamer	- —	5 00	- —	- —
Broken	- —	5 25	- —	4 25 to 4 40
Egg	5 75 to 6 25	5 25	- —	4 25 to 4 40
Stove	- —to- —	5 75	- —	4 25 to 4 40
Chestnut	4 50 to 5 40	4 75	-	4 00 to -
Pea	- —	- —	- —	- —
LEHIGH.				
Lump, (along side)	6 00	- —	- —	- —
Broken	5 75	- —	- —	- —
Egg	5 75	- —	- —	- —
Stove	6 00	- —	- —	- —
Chestnut	5 25	- —	- —	- —
Pea	- —	- —	- —	- —
SPECIAL COALS.*				
Diamond Vein	R. A.	- —	- —	- —
New England	"	- —	- —	- —
Locust Dale	W. A.	- —	- —	- —
Honey Brook, Leh	W. A.	4 75 to 5 75	- —	- —
Spring Mountain	" "	4 75 to 5 75	- —	- —
Sugar Creek	" "	4 75 to 5 75	- —	- —
Sugar Loaf	" "	4 75 to 5 75	- —	- —
Old Comp'y's	" "	4 75 to 5 75	- —	- —
Cross Creek	" "	4 75 to 5 75	- —	- —
Enterprise	" "	- —	- —	- —
Girardville	" "	- —	- —	- —
McMichael	" "	- —	- —	- —
Shamokin	" "	5 50	4 50	- —
Lykens Valley	" "	- —	- —	- —
Broad Top	" "	5 50	- —	- —
Hill & Harris	" "	- —	4 50	- —
Henry Clay	" "	- —	4 50	- —
Powelton	" "	5 50	4 50	- —

Prices for Coal at Mauch Chunk.

	F.L.	Bro.	Gra.	Eg.	Sto.	Cst.
Lehigh	$3 50	$3 50	$3 50	$3 50	$3 75	$3 00
W. & N.Y. C. & R.R. Co	3 50	3 50	3 50	3 50	3 75	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila	$5 00
Lemon " " "	4 75
Cumberland Vein Coal	5 00
Cumberland C. & I. Co.'s on board N. Y.	7 00
Maryland Coal Co. "	7 00
Consolidated Coal Co.'s " "	7 00

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	4 50	4 50	4 75	5 00	5 75	4 60
Pittston at Newburgh	4 60	4 60	4 70	4 90	5 10	4 50
Lackawana at Rondout	4 50	4 60	4 70	4 90	5 20	4 50
Wilk'b're at Hoboken	4 75	4 75	4 25	5 00	5 35	4 60
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	5 50	5 25	5 25	5 25	5 50	4 75

For freights to different points, see "Freights."

Prices at Baltimore—June, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 50
Pittston and Plymouth, do	5 00@5 25
Shamokin Red or White Ash, do	5 50@6 00
Lykens Valley Red Ash, do	5 40@5 50
Zerba Valley	25 5-— —
By retail, all kinds per ton of 2240 lbs	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
Fairmont and Clarksburg gas, f. o. b. at L. Point	5 35@5 50

Prices at Georget'n, D.C., & Alexandria, Va.

June, 1870.

George's Creek and Cumberland f. o. b. for shipping..$4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes ..$- —@- —
Lykens Valley — —@- —
Shamokin Red or White Ash — —@- —
Trevorton and Zerba Valley — —@- —

Prices of Gas Coals.

June, 1870.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.

	Duty, $1 25, gold. Coarse.	Slack.
Block House	$1 75 @- 75	
Gowrie	1 75 @- 75	

Corrected by Bird, Perkins & Job, 88 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 75	@- 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Coarse.	Slack. Culm.
Fairmount Gas Coal Co. of N. Y.	7 50	@- —
Despard Coal Co	$7 50	@- —
Penn	— —	@- —
Newburg Orrel Gas	— —	@- —
West Fairmount Gas Coal	— —	@8 00

AT PHILADELPHIA.

Powelton $7 50

Prices of Foreign Coals.

June, 1870.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 00@12 00
" House "	13 50@15 50
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven $2 00

From Port Carbon, 8 cents per ton more.

Less drawback of 80 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 81
C. R. R., N. J., Easton to Elizabethport	1 12
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 28

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$ 81
C. R. R., of N. J., Easton to Pt. Johnson	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 81
Morris & Essex R. R. Easton to Hoboken	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO SOUTH AMBOY.

L. V. R. R.	81
B. & D. R. R.	1 09
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 15

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	95
C. RR. of N. J. Easton to Elizabethport	1 19
Shipping expenses	25
Wharfage	10
Total	$2 49

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris "	1 10
Freight	
Towing	
Total	$ 2,50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris "	2 00
Freight	
	2 40
For re-shipment	2 20
Total	$4 60

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1.06
Total	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Freights.—JUNE, 1870.

TO EASTERN PORTS.	From Philadelphia.	From E. Portand and Port Johnston.	From Medway	From Rondout
Amesbury	$2 75	$- —	$	$
Bangor	2 75	- —	1 60	
Bath	2 00	2 00	1 50	
Boston	2 00	1 63	2 00	1 75
Bridgeport	1 60	1 00	1 10	1 20
Bristol	2 00	1 25	1 40	
Cambridgeport	2 50	2 00		
Derby	2 00	- —		
Dighton	1 85	- —	1 45	
East Cambridge	2 00	2 00		
Fall River	1 75	1 25	1 40	
Hackensack	1 95	1 50		
Hartford	2 75	1 35		
Jersey City	1 75	50		
Middletown	- —	1 25		
Mystic	1 75	1 25	1 30	
New Bedford	1 75	1 40		
Newburyport	2 15	2 00		
New Haven	1 70	1 00	1 10	1 20
New London	2 00	1 15	1 25	1 30
Newport	1 75	1 25	1 40	
New York	1 25	50	70	
Norwalk	1 70	1 00	1 05	
Norwich and tow	1 70	1 35	1 35	1 40
Pawtucket	1 90	1 50	1 60	
Portland	2 00	1 75		
Portsmouth, N. H.	2 00	2 25		1 85
Providence	1 75	1 40	1 45	1 45
Rockport	2 10	- —		
Saco	2 30	2 10		
Sag Harbor	2 00	1 40	1 30	
Salem	2 00	1 60		1 75
Stamford	2 00	1 00	1 00	
Stonington	2 00	1 30	1 25	
Taunton	2 75	2 00		
Warren	- —	1 40	1 45	
Washington	1 10			
TO RIVER PORTS.				
Albany		90	- 60	
Catskill		- —	- 50	
Cockaackie		- —	- 50	
Coeyman's		- —	- 75	
Cold Spring		- —	- 35	
Fishkill		- —	- 30	
Haverstraw		50	- 60	
Hudson		- —	- 50	
New York		- —	- 70	
Nyack		50	- 60	
Poughkeepsie		- —	- 35	
Rhinebeck		- —	- 30	
Rondout		- —	- —	
Sangerties		- —	- 40	
Sing Sing		- —	- 75	
Stuyvesant		- —	- 55	
Tarrytown		80	- 75	
Troy		90	- 75	
West Point		- —	- 35	
Yonkers		40	- 60	

Foreign and Provincial Freights.

June, 1870.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool	12s.6d@14.ton

TO NEW YORK.

Provincial

Sidney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven,	$ 40
Bridgeport,	40
Southport,	40
Westport,	40
Norwalk,	40
Stamford,	40
	Per Boat.
Greenwich,	$70 00
Port Chester,	80 00
Mamaroneck,	70 00
Glen Cove,	
New Rochelle,	55 00
East Chester,	60 00
West Chester,	30 00
White Stone,	30 00
College Point,	25 00
West Farms,	25 00
Flushing,	30 00
Harlem and Mott Haven,	20 00
Port Morris,	20 00
Ninety-first street and Astoria,	15 00

Boats beyond Port Chester, with less than 200 tons, $80 per Boat.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville,	8 cents.
Spuyten Duyvil,	8 "
Yonkers,	9 "
Hastings,	10 "
Piermont,	12 "
Dobbs' Ferry,	12 "
Nyack,	14 "
Tarrytown,	15 "
Sing Sing,	16 "
Croton Landing,	17 "
Haverstraw,	17 "
Verplanck's,	17 "
Peekskill,	18 "
West Point,	20 "
Cold Spring,	20 "
Newburgh,	20 "
Poughkeepsie,	22 "
Rondout,	23 "

Boats of 100 Tons	Per Boat.
To Manhattanville, and Return,	$11 00
Spuyten Duvvil, "	13 00
Yonkers, "	15 00
Sing Sing, "	20 00
Peekskill, "	25 00

METALS.

NEW YORK, June 24, 1870.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1¼ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 9 ₱ ton; Polished Sheet, 3 cents ₱ lb.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	33 00@36 00
Pig, American, No. 1 " "	32 00@33 —
Pig, American, No. 2 " "	30 —@31 —
Pig, American, Forge " "	29 —@30 —
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
Bar, Swedes, ord'y sizes, less 5 ₱ ct.....cash	110 —@ —
Bar, Refined " "	— —@ 77 50
Bar, Common " "	72 50@ —
Scroll " "	87 50@115 —
Ovals and half-round " "	95 —@110 —
Band " "	95 —@ —
Horse Shoe " "	95 —@ —
Rods, ⅝ to 3-16 inch " "	85 —@120 —
Hoop " "	105 —@145 —
Nail rod, less 5 ₱ ct.	7 —@7½
Sheet, Russia, as to Nos. (gold)	11 @—11½
Sheet, Single, D. and T Common	4¾@— 5¾
Sheet, Galv'd, Nos. 14 to 26 12 and 14 c. 25@30 ₱ c. off	
Rails, English (gold), ₱ ton	59 00 @60 00
Rails, American, at Works in Pa	71 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— — @— 18
American, Spring, do.	9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 30
Copper Braziers, 16oz. and over	— @— 30
Copper Nails	35 @— 36
Copper, Old Sheathing, &c., clean	— @— 17
Copper, Chili Pig	— @— —
Copper, American Ingot	19¾@— 20½
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— @— —
Spanish (gold)	6 20 @6 25
German, do.	6 20 @6 40
English, do.	6 20 @6 45
Bar (net)	7 70 @— —
Pipe and Sheet (net)	7 70 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	— @39½
Straits	— @38
English	— @35½

PLATES.

	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ₱ box	$8 75 @9 —	$10 00 @10 50
I. C. Coke	7 — @7 75	8 25 @ 9 25
Coke Terne	6 — @6 25	7 25 @ 7 75
Charcoal Terne	7 75 @8 25	9 — @ 9 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100

	Gold.
Plates, Foreign ₱ 100 lbs.	$5 85 @6 25
Plates, Domestic ₱ lb.	7 @— 11½

REMARKS.

COPPER.—New Sheathing is steady at 30c., and Yellow Metal at 22c., cash. For ingot there is only a moderate demand at unchanged prices; the sales embrace 375,000 lbs. Lake Superior at 20¼@20½c., mostly 20¼@20½c.; and 75,000 lbs. Baltimore at 19½c.

IRON.—There has been a little more doing in Scotch Pig, but at lower prices. The sales are 300 tons Coltness, part at $30 75 gold, and $200 do. Glengarnock, $33 currency. American meets with very little inquiry, and the market is still weak and irregular. We have to only notice a sale of 100 tons No. 1 Allentown, on private terms. We have no sales of Rails to report since our last, but the market remains firm at quoted rates. Bar from store continues dull, and we hear of sales of Refined as low as $75, generally held at $77 50 per ton, currency.

LEAD.—Pig remains dull, and we hear of none but small jobbing sales; prices are nominally as before—say $6 20@$6 25, gold, for ordinary Foreign. Bar, Pipe and Sheet $7 70 ₱ 100 lbs, net cash.

STEEL.—Both English and American are in only moderate demand at old figures—orders for English Cast are taken at 13½c, gold.

SPELTER.—There is no inquiry for Foreign, and prices are nominal. 40 tons American Zinc Works sold from dock at 8c., and 30 do. from store, 8@8¼, cash.

TIN.—Straights Pig is steady, but Banca and English soften a little; sales have been made of 100 slabs Straights at 38c.; and 500 do. in Boston, 37½c.; English nominally, 35½c., and Banca, 39½c., all gold. The market for Plates, though not active, is very strong, owing to a decreased production agreed upon by makers, a scarcity of water also interfering to a considerable extent with the manufacture; we notice sales of 1,000 boxes of Charcoal Tin at $8 75 for I C; and 400 do. I C Coke, $7 37½, both gold.

American Oxide Zinc, 6½@7c.; French do. do., 9@9½c.; Sheet Zinc, 9@10c. Manganese, 4@4½c.

Mining Stocks.

NEW YORK, June 25, 1870.

Mining stocks are quoted this week in our table at prices still farther advanced. Colorado's are especially worthy of mention in this respect. Consolidated Gregory is now held at $1 25, and Smith & Parmlee, $1 00@1 10. At the Board yesterday, sales were made of Central at 27c., and Grass Valley, 33@35c., in lots of 500 shares.

In Petroleum stocks, save an advance of 5c. in Brevoort, there is a still farther decline shown in the following list of prices compared with those of last week:

	Bid.	Asked.
Bennehoff	—	—
Bergen Coal and Oil	40	50
Bliven Oil	40	—
Brevoort	1 05	—
Buchanan Farm	45	50
Central	65	70
Home Petroleum	3 00	4 00
National	25	—
N. Y. & Alleghany	2 00	—
Northern Light	60	1 00
Pithole Creek	1 30	1 60
Rathbone	25	40
Rynd Farm	31	35
Second National	—	75
Clinton	1 00	—
Blood Farm	50	—
United Petroleum Farms	20	25
United States	65	85

San Francisco Stock Market.

Prices of Comstock Stocks rule still lower, being thus quoted in San Francisco, June 23:

Savage	41	Gould & Curry	62
Yellow Jacket	43	Belcher	No sales.
Kentucky	34	Imperial	36½
Chollar Potosi	27½	Amador	2 16

The Slate Trade.

NEW YORK, June 23, 1870.

We continue our quotations unchanged the present week. The shipments of slate by the various roads this week is in excess of last week by some 200 squares. The tables also show a decided increase in the amount of other slate shipped. In another column will be found a sketch by our regular correspondent of the Twin City slate quarries.

[Corrected weekly.]

PRICES OF ROOFING SLATE.

(A "square" represents 100 superficial feet.)

Vermont purple, 1st quality, per square	$9 50@10 50
" green, 1st " "	9 50@10 50
" red, 1st " "	15 00@16 00
" variegated, " "	8 5 @ 9 50
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending June 18, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Jones & Williams	350 squares.
Lehigh Slate Co	35 "
Saylor & Morgan	70 "
Kuntz & Woodring	140 "
Girard Slate Co	35 "
D. Thomas	.. "
Blue Mountain Slate Co	.. "
Locke Slate Co	140 "
American "	105 "
D. Williams & Co	35 "
Keystone Slate Co	.. "
Hope " "	70 "
Star " "	105 "
Columbia " "	35 "
Jones & Town	70 "
J. M. Coffin & Co	70 "
Total	1260 "

SCHOOL SLATES.

D. Williams	7 cases.
Lehigh Slate Co	50 "
A. W. Lerch	.. "
Locke Slate Co	25 "
Total	82

BLACK BOARDS.

Lehigh Slate Co	2 cases.

MANTELS.

Yerkes & Martin	8 cases.
Lehigh Slate Co	1 "

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Eagle Slate Co	70 squares.
Thos. W. Parry	105 "
Twin City Slate Co	100 "
J. H. Walp	35 "
Lehigh River Slate Co	.. "
William Chapman	.. "
Mauch Chunk Slate Co	.. "
New York and Penn. Slate Co	40 "
Philadelphia	35 "
Total	385 "

LEHIGH CANAL.

ROOFING SLATE.

Heimbach Slate Co	.. squares.

	Week.	Previously.	Total for Year.
L. and S. R. R.	385	2,389	2,774
L. V. R. R.	1,260	6,485	7,745
Lehigh Canal	..	762	762
Total	1,645	9,636	11,281

Uranium.

AT Wheal Owles meeting, Mr. BOYNS, in his observations on the various workings of lodes throughout the mine, referred to the discovery of "oxide of uranium" on the Wheal Edward lode. This is well known to be a valuable metal. Mr. BOYNS stated that he had sold five cwts. of it at 3s. 3d. per lb. He believed they could soon raise pretty much of it, and considered when properly dressed and brought into its pure state, fit for the market, it would be worth over £500 per ton. With reference to the discovery of uranium, a correspondent states that Mr. WM. JORY HENWOOD, F. G. S., etc., who may be considered one of our greatest authorities on all matters connected with geology, found phosphate of uranium, alias uranite, on Great Edward lode (which is in the seaward portion of Wheal Owles), during the former working, about forty years ago; consequently there can be no doubt whatever of the existence of this variety.—*Mining Journal, June 4, 1870.*

MINING COMPANIES AND STOCK QUOTATIONS.

GOLD AND SILVER COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Alameda Silver		A. Queran, 108 Wall st.	$2,000,000	$10 00		
Ada Elmore	South Boise, Idaho					
American Flag	Nevada District, Col.	P. P. Fullerton, 71 B'way	600,000	10 00		
Atlantic and Pacific	Humboldt Co., Nevada.					
Bates and Baxter	Colorado			50 00	20	75
Benton	Colorado	W. F. Drake, 15 Broad	500,000	5 00	09	10
Briggs	Colorado	J. P. Davies, 19 Cliff	1,000,000	100 00		
Black Hawk	Colorado	C.T.Whittington, 48 Broad	2,500,000	100 00	28	30
Bobtail	Colorado	J. Stanton, Jr., 25 Nassau	1,000,000			
Bullion Consolid'ed Gold	Colorado					
Burroughs Gold	Colorado					
Central Gold					24	25
Consolidated Gregory	Colorado				1 15	1 25
Combination Silver	Nevada			100 00		1 50
Columbia Silver	Austin, Nevada	J. M. Brown, 155 B'way	5 000,000			
Commercial Silver		J. E. Smith, 26 Pine	3,000,000			
Corydon	Gilpin Co., Colorado	J. Samuels, 40 B'way	500,000			
Downieville	Colorado		2,500,000	25 00		
Eagle Gold	Gold Dirt Dist., Col.	J. P. Davies, 19 Cliff	300,000	1 00		
Empire Gold and Silver	BodieBluff, MonoCo. Cal	H. K. Gates, 70 B'way	1,000,000			
Edgehill		A. Fullerton, 71 B'way	10,000,000			
Esperanza Silver		Ezra Clark, Jr., 13 William	400,000			
Fisk Gold		H. Johnson, 195 Fulton	300,000			
Forest Queen		E. B. Beet, 62 B'way	1,000,000			
Golconda Gold	Sherbrooke, C. E.	H. Adams, 71 Broadway	2,000,000			
Gunnell Gold	Colorado	J. H. Rolston, 80 B'way	2,000,000	50 00	15	
Gunnell Central	Colorado	C. B. Bostwick, 16 B'way	3,000,000	10 00		
Gold Rock		R. M. Lockwood, 93 Wall	400,000			
Grass Valley					33	35
International Silver		J. W. Brazier, 26 Pine	600,000			
Hope Gold	Colorado		5,000,000			
Holman			2,000,000	25 00		
Kipp & Buell	Colorado		300,000			
Knickerbocker Gold		J. H. Rolston, 80 B'way	200,000	100 00		
La Crosse Gold	Nevada Dist., Col.	P. P. Fullerton, 71 B'way	1,000,000		11	12
Lander Hill T. & S.	Nevada	M.L.Catherwood, 74 B'way	1,000,000			
Lewis Gold	Georgia		1,000,000			
Liberty Gold					02	
Manhattan Silver	Nevada	M. L. Ogden	400,000			
Maraposa common	California	Jas. H. Ferdon, 34 Wall	12,000,000			8
Mariposa preferred	California	do. do.			16½	16
Montana Gold		G. De Cordova	400,000			
Montana M. L. & M. Co.	Montana	A. M. Hoyt, 22 William	250,000			
Montrose	Clear Creek Co., Cal.	W. W. Perkins, 71 B'way	1,000,000			
New York Silver	Nevada	Thos. Sproull, 78 B'way	1,500,000			
New York and Austin	Nevada	E. R. Siccomb, 70 Wall	500,000			
New York and Owyhee	Owyhee Co., Idaho		1,000,000			
New York and Eldorado		G. H. Munroe, 10 Wall	2,000,000		30	
N. Y. & Montana M. & D.	Montana	F. A. Chapman, 20 Nassau	1,250,000			
N. Y. & Silver Peach	Nevada	R. C. Root, 74 B'way	2,000,000			
N. Y. & Utah P. & M.		W. H. Mailler, 108 Wall				
Nye						
Ophir Gold	Comstock Lode, Nev.	L. C. Warner, 70 B'way	625,000			
Owyhee Gold		W. H. Smith, 43 Ex. Place	1,700,000			
Pahranagat Central	Nevada	J. E. Smith, 25 Pine	6,000,000			
Quartz Hill Gold		F. Bernard	2,500,000			
Reese River Consol'd	Nevada	W. B. Ogden	6,000,000		25	
Rocky Mountain	Colorado	S. M. Pond, 70 B'way	500,000	10 00	05	08
Rollins Gold		Thos. Bond, 132 B'way	600,000			
Sensenderfer	Colorado	H. A. Shewill, 19 Broad	1,000,000		1 00	
Silver Bend		F. W. Macy, 20 Nassau	1,500,000			
Silver Mt. Silver		H. A. Moen, 71 B'way	1,000,000			
Silver Peak & R. M.	Nevada	W. B. Ogden, 52 Wall	5,000,000			
Smith & Parmelee	Colorado	W. H. Hollister, 6 Broad	2,500,000	20 00	1 00	1 10
Social & Steptoe Con.		T. H. O'Connor, 24 Nassau	450,000			
Standard Gold		C. B. Bostwick, 169 B'way	500,000			
Symonds Forks						75
Twin River Silver	Nevada	J. F. R. Hadden, 20 Nassau	800,000	100 00		
Texas Gold	Colorado		500,000	10 00		
Union Gold	Colorado	F. A. Potts, 110 B'way	1,200,000			
Wash. Mill & Silver	Nevada	W. W. Perkins, 71 B'way	300,000			
Wauba Yuma	Arizona	J. W. Si sby, 36 Pine	6,000,000			

COAL AND IRON COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Coal Co		M. A. Myers, 119 B'way	$1,500,000	$25 00		
Ashburton Coal Co		J. T. Rollins, 41 Pine	2,500,000			
Block House Coal		D. B. Keeler, Jr., 43 Pine	1,000,000			
Brewster Iron		H. Robison, 165 B'way	150,000			
Broad Top Coal & Iron Co	Pennsylvania	B. Love	2,000,000			
Cameron Coal Co		J. A. Simpson, 40 B'way	2,500,000			
Carbon Hill Coal Co		J. Silsby, 36 Pine	1,000,000			
Central Coal		F. P. White, 111 B'way	2,000,000	100 00		
Clifton Iron Co		P. H. Riordan, 34 Pine	1,250,000			
Columbia Iron		E. D. Webb, 77 Cedar	1,000,000			
Consolidation Coal	Maryland	J. S. Mackie, 71 B'way	5,000,000			
Crawford Coal		E. Clapp, Prest, 137 B'way	1,000,000			
Cumberland C. & I. Co		S. Kisean, 90 B'way	5,000,000			
Derby Coal Co		W. S. Davison, 11 Broad				
Dover Coal and Iron Co		L. Chase, 88 Wall				
Del. & Hudson Canal Co		R. H Nodyne, 7 Nassau	15,000,000	100 00		
Ebervale Coal		G.L.Stout, Treas., 111 Br'y	500,000			
Fall River Bituminous		D. T. Blauvelt, 43 Pine	1,000,000			
Farrar Coal		C. H. Jones, 43 Pine	250,000			
Fisher Iron Co		M. Ellis, 19 William	100,000			
Hamp're & Balt. Coal		S. M. Pond, 70 B'way	500,000			
Iron Cliffs Co		C. J. Canda, 52 Wall	1,000,000			
Jackson Iron		G. P. Loyd, 119 B'way	300,000			
Kemble Coal & I. Co		R. A. Wight, 26 Ex. Place	300,000			
Keokuk Coal		J. F. Franklin, 112 B'way	100,000			
Lackawanna I. & C	Pennsylvania	E. C. Lynde, 52 Wall	1,200,000			
Lewis Run C. & I. Co		C. A. Sanborn, 80 B'way	750,000			
Lykens Val. Coal Co		F. A. Platt, 13 William	800,000			
McKean Co. Bit. Coal Co.		J. H. Rolston, 80 B'way	1,000,000			
Lehigh & Susquehanna		E. W. Cark, Philadelphia, Pa.			1 05	
Mahanoy			400,000	100 00		
McNeal C. & I. Co		C. C. Godwin, 71 B'way	500,000			
Mount Riga Iron		G. M. Newton, 42 Cedar	300,000			
New Boston Coal		C. H. Ogden, 55 B'way	2,000,000			
N. Y. Con. C. & I. Co		A. T. Levine, 16 Wall				
N. Y. & Lehigh Coal		T. Simpson, 111 B'way	150,000			
Pacific Coal Co		G. Wrighton, 34 Wall				
Peekskill Iron Co		W. Murdock, 7 Nassau				
Pennsylvania Coal Co		E. H. Mead, 111 B'way	3,200,000	50 00		
Richmond Iron Co		C. H. Smith, 165 B'way	1,000,000			
Scotia Coal Co		L. S. Soper, 42 B'way	2,500,000			
Spring Mt. Coal		C. Runyon, 111 B'way	1,250,000			
Springfield & D'p Run C.		E. D. Webb, 77 Cedar	600,000			
Stout Coal Co		G. S. Comstock, 111 B'way	500,000			
Susquehanna & Wyoming		E. Potter, 40 B'way	1,000,000			
Tannerdale Coal		I. T. Ludlaw, 71 B'way	250,000			
Wash. Mutual Coal		M. C. Baker, 117 B'way	420,000			
West Point Iron Co		R. C. Brock, 110 B'way	500,000			
Wilkesbarre C. & I. Co		W. H. Tillinghast, 80 Br'y	3,400,000			
Wyoming Val. Coal Co		E. Potter, 40 B'way	1,000,000			

COPPER AND LEAD COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED
Anita Copper	California	J. A. Ferguson, 8 Wall				
Corinth Copper	Corinth, Vermont	S. H. Howard, 191 B'way	$500,000	25 00		
Davidson Copper						
Eagle Harbor Copper	Michigan	W. H. Smith, 43 Ex. Place	500,000	25 00		
Evergreen Bluff Copper	Michigan	F. W. Caper, 44 Ex. Place	500,000	25 00		
Globe Copper		R. K. Rickard, 19 Nassau	200,000			
Grand Portage Copper Co		A. S. Kellogg, 22 Pine	500,000			
Guymard Lead		Samuel Vernor, 38 Pine				
Hilton Copper		W. H. Smith, 43 Ex. Place	500,000			
Hope Copper		J. W. Davis, 19 Nassau	500,000			
Hudson River Copper	New York	T. Clarkson, 22 William	1,500,000			
Indiana Copper Co		J. M. Mills, 25 Nassau	500,000			
Isle Royale Copper	Michigan	F. W. Caper, 44 Ex. Place	1,000,000			
Keweenaw Copper	Michigan	F. W. Caper, 44 Ex. Place	500,000			
Lake Superi'r Silver Lead	Michigan	A. S. Kellogg, 22 Pine	1,000,000			
Omiga Copper	Michigan	S. Cooper, 7 Pine	500,000			
Ridge Copper	Michigan	J. L. Gardiner, Jr., 43 Ex. P.	500,000			
Rockland Copper	Michigan	A. Fullerton, 71 B'way	500,000			
St. Joseph Lead	Michigan	J. W. Jones, 6 Broad st,	1,000 000			
St. Marguret Copper		E. P. Sutton, 43 Pine	250,000			
Schoolcraft Copper		R. Walsh, 22 William	500,000			
Superior Copper	Michigan	A. Fullerton, 71 B'way	500,000			
Union Copper		A. S. Kellogg, 22 Pine	500,000			
Vermont Copper	Vermont	J. C. Ely, 191 B'way	500,000			04
Wallkill Lead, asst		S. M. Pond, 70 B'way				

MISCELLANEOUS.	SITUATION MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Zinc Co		W. E. Lawton, 19 Cliff	$1,000,000			
Bigelow Blue Stone Co		H. Bogardus, 14 Pine				
Quicksilver					7	9
Covill B. L. M. & M'f. Co		C. R. Bostwick, 302 Pearl	250.000			
Manhattan Marble		H. K. Gates, 70 B'way	300.000			
N. Jersey Zinc Co	New Jersey	A. H. Farlin, 61 Maiden L'e.	1,500,000			

American Iron and Steel Association.

THE annual meeting of the American Iron and Steel Association was held on the 15th inst., at the rooms of the Association, No. 522 Walnut street, Philadelphia. The fifth annual report embodies data respecting the iron and steel industries of the country.

Pig iron manufacture continued with increased vigor during 1869 over an extending field. Several States that five years ago were compelled to purchase every pound of pig iron for consumption, now produce many thousands of tons annually. Prior to 1860 Indiana produced about 1,000 tons of charcoal pig iron annually. In 1867, the old supply having failed for seven years, a large bituminous coal furnace, with a capacity of 9 000 tons, and a capital of $150,000 was started. Seven large furnaces are now in operation, with a united capacity of 35,000 tons annually, and a capital of $725,000. Four additional furnaces would have been erected last year but for fear of legislation adverse to iron interests. Illinois has been content with making a few hundred tons of pig iron till within the past eighteen months; now six large stone coal furnaces are started, with a capacity of over 60,000 tons. A bituminous coal furnace, able to make 35 tons daily has been erected at Milwaukee, Wisconsin. Missouri has gained five large stone coal furnaces in the past year. The State has now a capacity of 300 tons of pig iron per day, with means for greatly increasing the production, should legislation be propitious. From Eastern Kentucky a citizen writes:—"The Kentucky Improvement Company propose to extend their road 30 miles to a large deposit of ore, opening up a great charcoal section and transporting ore to the river for sale, and to smelt in furnaces which they propose to build. Let prosperity be guaranteed to us by an adequate tariff, and we will see furnaces every few miles giving employment to a hard industrious people; this whole section changed from a hunter's wilderness to the most wealthy and valuable part of the State." In several of the Southern States, where, before the war, only a few hundred tons of iron were made in forge fires, companies are being formed and capital raised for the purpose of converting their beds of coal and pure rich ores into the various products required by a growing diversity of interests. Many of the present most active champions of home labor come from that section of our country.

The yearly product of anthracite iron for the past ten years has been as follows:

Year.	Tons.	Year.	Tons.	Year.	Tons.	Year.	Tons.
1860	519,211	1863	577,638	1866	749,367	1868	893,000
1861	409,229	1864	684,018	1867	798,638	1869	971,150
1862	470,315	1865	479,558				

This production of anthracite pig iron for 1869 is thus divided: Massachusetts, 4.200 tons; New York, 210,855 tons; New Jersey, 54,201 tons; Pennsylvania, 692,739 tons; Maryland, 9,155 tons. Total, 971,150 tons. In Pennsylvania, this branch of manufacture exhibits the greatest growth on the Lehigh, and the least on the Susquehanna. Last year, 300,916 tons were made in the Lehigh region; 150,409 tons in the Schuylkill region; 123,273 tons on the Upper Susquehanna, and 118,141 tons on the Lower Susquehanna.

The production of raw bituminous coal and coke pig iron in 1869, was 553,341 tons, an increase of 213,341 tons or 62.74 per cent. over 1868. In 1854, the amount of this manufactured was 54,485 tons, and the average annual increase since has been 54½ per cent. Ohio has greatly increased its production. In the Hanging Rock Region the furnaces employ a capital of $1,000,000, and have increased their capacity 40,000 tons annually within three years. In the Mahoning region twelve large bituminous coal furnaces have been started within the last three years, and they employ a capital of $750,000. Two large bituminous furnaces have just been erected in Michigan.

The annual production of charcoal pig iron for the last ten years has been quite variable, as this statement shows:

Year.	Tons.	Year.	Tons.	Year.	Tons.	Year.	Tons.
1860	278,331	1863	212,005	1866	332,850	1868	370,000
1861	195,278	1864	24 ,853	1867	344,341	1869	392,150
1862	186,669	1865	262,342				

There was a steady falling off in this production from 1854 to 1862, the former year reaching 342,298 tons; and as steady an increase in the past seven years.

While but little progress has been made in this branch in the New England and Middle States during the past three years, its growth in the West has been exceedingly gratifying. Ohio has largely increased its facilities for manufacturing this iron. Michigan has six new charcoal furnaces blown in, with a capacity of between 30,000 and 40,000 tons. In Wisconsin, a new furnace was put in blast in 1869, another in the beginning of this year, and a third is now under way. Two new furnaces, using charcoal for fuel, have been built in Missouri, and several in Kentucky. In the Southern States a number of old charcoal furnaces, that went out of blast when the war ended, have recently been repaired and lighted. They are as follows: One near Lincolnton, N. C., making about 1,500 tons per annum, a considerable part of which is converted into hollow ware, and other light castings, for local consumption. Two in Cass county, Ga., which made in 1869, 487 tons of charcoal iron, most of which was also consumed for hollow wares. Three in Alabama, which made respectively 500 tons, 4,908 tons, and 1,756 tons. This State is making a great effort to develop her mineral resources. The late Legislature passed an act granting aid to several important railroad companies, upon the condition that in the construction and equipment of said roads preference must be given, terms being equally favorable, to all contracts for cross-ties, rails, chairs, spikes, joint-fastenings, locomotives, cars of all kinds, and other materials and equipments, to the proprietors of such foundries, mills, manufactories, and other works as are engaged in the manufacture of iron, of ores, and of the other raw materials found in the limits of the State of Alabama.

The whole product of pig iron of all kinds in the United States in 1869 was 1,916,641 tons, as follows:

	Tons.
Anthracite Pig Iron	971,150
Raw Bituminous Coal and Coke Pig Iron	553,341
Charcoal Pig Iron	392,150

The product in 1865 was 931,000; thus it has more than doubled in four years. This enormous increase in the production is due in a great measure to the operation of a Protective Tariff, and the noble response of this industry to the requirements of the country overthrows some of the most plausible theories of Free Trade.

The product of the rolling mills of the country in 1869 was, in tons of 2,000 lbs., as follows: Massachusetts, 32,238 tons; New York, 79,463; Pennsylvania, 319,653; Maryland, 27,328; Ohio, 41,837; Kentucky, 7,817; Michigan, 6,885; Illinois, 53,261; Wisconsin, 8,680; other States, 16,424. Total, 593,586 tons.

The progress of this branch of manufacture during the past ten years is shown by the following table, the tons being 2,000 pounds:

Year.	Tons.	Year.	Tons.	Year.	Tons.	Year.	Tons.
1860	205,038	1863	275,768	1866	430,778	1868	506,714
1861	189,818	1864	335,369	1867	462,108	1869	593,586
1862	213,912	1865	356,292				

During 1869 we imported from Great Britain 336,500 tons of rails, an increase of 36,340 tons as compared with 1868, 151,459 tons over 1867, and 216,622 tons over 1866. The total importations of rails in 1869 were probably 345,000 tons, making a total consumption of 938,586 tons. Of the above product, 9,650 tons were Bessemer steel.

The produce of the rolling mills other than rails in 1869, was 642,420 tons, which may be divided thus:

	Tons		Tons.
Merchant, bar and rod	292,500	Hoop	1",200
Sheet	36,320	Nail's and spikes	146,400
Plate	78,000	Axles, &c	72,000

Of these kinds of manufactures we imported 120,795 tons, making the total consumption of rolled iron other than rails, 763,215 tons. The product of the forges and bloomaries in 1869 was 69,500 tons, a slight decrease as compared with the average of the past five years. Of steel of all kinds the product was 35,200 tons, of which nearly 12,000 tons were made by the Bessemer process.

From the reports of the British Board of Trade, we find that the exports of iron of all kinds to the United States from the various British ports, (which represents nearly all the foreign iron entering into consumption here during the year 1869) was as follows:

	Tons.		Tons.
Pig iron	148,383	Castings	21,076
Bar, angle, bolt, and rod	62,807	Other wrought iron	9.555
Rails of all sorts	335,500		
Hoops, sheets, and boiler plates	37,233	Total Iron	596.554
		Steel	18,661

By comparing these figures with those of the previous year, we find of pig iron the increase in 1869 was 54 per cent.; bar, angle, bolt and rod, 28 per cent.; railroad iron, 12 per cent.; hoops, sheets and boiler plates, 80 per cent.; other wrought-iron, 71 per cent.; castings, 45 per cent. Total increase, iron, 26 per cent. Of steel there was a decrease of about 3 per cent.

Resume of the Main Advantages of Steam Road-Rolling.

No road can be a substantial one unless it has a good foundation. In this fact lies the great superiority of all the old Roman roads in Italy, the Berg-strasse in Germany, and many others built by the ancients. These roads have a superficial pavement on solid and closely-packed deep foundations of larger stones set on end. They have withstood the travel and wear of ages, and must, even at this date, be classed among the best highways in the world.

The steam road-roller, with its immense weight, is intended to secure, not alone a solid and closely-packed foundation, but also an even and dense surface. Briefly, the three principal advantages obtained by steam road-rolling over horse-rolling are, as observed in the French official report, "saving of expense, saving in time from rapidity of execution, and a better quality of work." All that has been said with respect to the great diminution in draught by horse-rolling applies with much greater force to rolling by steam. But even if steam-rolled roads were to cost *more*, instead of at least fifty per cent. less in maintenance than traffic-rolled roads, there would be good reason for adopting steam-rolling, as the public is well served under the first circumstances, and very badly served under the second.

The Minimum Annual Saving to London Rate-payers, Derivable from the Use of Steam Road-rolling.—After taking the most minute precautions against error, we feel some confidence that our figures of economy through road-rolling are much below the mark. We see that there are at least 1126 miles of macadamized roads in the metropolitan parishes, and that their total area is at least 21,562,605 square yards. We find that there were expended on the roads and streets in the London parishes and districts, during the year 1866-67, £714,662; and during 1867-68, £781,003. From a number of returns forwarded by different London surveyors, we estimate that the average annual cost of maintenance, exclusive of cleansing and watering, of the London macadamized roads, is £280,750, or about £250 per mile.

We have seen, from not less than seven estimates, that the saving in maintenance through horse-rolling can be estimated at forty per cent., and that the French, after nearly ten years' experience in Paris, consider that they save fifty per cent. in maintenance by steam-rolling, *over and above* horse-rolling. Therefore, if we assume that only fifty per cent. is saved by steam-rolling, we have a gain of more than £140,000 per annum in the London districts alone, without reckoning the diminutions of scavengering and watering, and many other sources of economy.

These, then, are some of the statistics of steam road-rolling, as reported to the London Metropolitan Board of Works by their Chief Engineer, Mr. PAGET. Our own street authorities may with advantage consult these particulars with reference to the roadways they have in charge, and profit by the experience of European surveyors, and others, who have given the matter their careful attention for years past.

The advantages of the process of steam-rolling to all descriptions of Telford or Macadam pavement appear to be self-evident, and were the same principles adopted with regard to the *foundations of wooden pavement*, equally beneficial results would follow.

THE ENGINEERING AND MINING JOURNAL, of June 14th, contains a report of the wearing of some of the wooden pavements in Chicago, amongst them are: "Wells street—subject to a good deal of heavy traffic, paved in summer of 1865. Not much worn, *somewhat uneven.*" "Wabash avenue—paved in Fall of 1865, in general good condition, though *uneven in places.*" "West Madison street—paved in the Spring of 1866, in very bad condition, *sunken and spread* at the street railway tracks." "West John street—paved in spring of 1866, in very bad condition, *rough and uneven.*" "North Clarke street—paved in summer of 1867, in bad condition, *uneven, worn, and spread a railway tracks.*"

It will be seen that most of these streets are in bad condition, more from the pavements having given way in sunken patches, than from actual wear. It is the neglect of making a secure foundation that causes all this evil and premature destruction. The thin pine plank upon which the wooden blocks are laid is soon saturated with moisture and damp, and readily yields to the uneven subway underneath. Compress this subway, consolidate it, and make it uniformly firm, by passing over it the heavy steam roller, and wooden pavements will wear double the time they do now; there will be no "uneven" patches and "bad condition" until the materials of the roadway has actually worn way.

The Macadam or Telford pavement, too, is, as has been seen, rendered doubly durable by steam-rolling. It now becomes a solid and smooth pavement, ready for the traffic as soon as laid, instead of having, as heretofore, to wait months for the "setting" of the loose stones, it is cleanly and silent; and, moreover, can be laid down for one half the first cost of wooden pavement, and kept in repair for little more than the *interest on the increased cost of laying down a wood pavement*, which will wear out *altogether* in five or six years, and have to be relaid again at a repetition of the first enormous cost.

Swain's Patent Turbine Water-Wheel.

IN our article published on this subject in Vol. IX., No. 23, the following two errors occurred: Second column, line seven from the top, read "rims" instead of "wind," and line forty-two, same column, read "J. B. FRANCIS, C. E.," for J. B. FRANCIS & Co."

The Proposed Mint Reform.

THE recent report of Mr. JOHN JAY KNOX, Deputy Comptroller of the Currency, addressed to the Secretary of the Treasury, on the subject of proposed reforms in the mint system of the United States, and accompanied by the draft of a bill embodying those reforms, is an able and important paper. To many of the provisions of this bill there can be no objection; a few are strongly opposed; but, even with regard to these, it must be admitted that the recommendations of Mr. KNOX are concurred in by a large and respectable body of experts.

The codifying of all preceding laws in one enactment is of itself a decided improvement; and the law thus simplified will be administered with directness and discretion by the central office, now for the first time created. Heretofore the director of the mint at Philadelphia has had ex-officio charge of all branch mints and assay offices in the country—an anomaly which grew up gradually, and the result of which has been to leave a most important department of the government without any head or representative at Washington. If it is necessary to have special officers and bureaus in the Treasury to look after currency and the national banks, then the mints and coinage should also come under the management of a regular bureau.

Another feature of importance in the bill is the abolition of the coinage charge. Mr. KNOX shows very clearly that our mint charges are so high in comparison with those of other countries as to make it pay the owner of a bar of bullion to send it to Paris or London for coinage. In other words, we are taxing our gold out of the country. Of course the precious metals will be exported when the balance of trade is against us. It would be folly to legislate against so inexorable a commercial necessity. But under the present system the precious metals are exported, even when the balance of trade is not against us, for the profit obtainable upon them as commodities. This is an unnatural and artificial state of affairs. England, at the dictate of a long experience, has abolished her coinage charge; the charge at the French mint is only two-fifths of ours; and, finally, the proposed abolition of the charge in the United States is but a return to our own earlier policy, unwisely changed in 1853.

To the clause permitting the mint to purchase refined bullion, the New York *Tribune* vehemently objects, asserting that it is intended to create a monopoly. This sounds preposterous enough. It certainly destroys a monopoly, namely, the monopoly thus far enjoyed by the mint itself, which has received bullion, assayed and refined it, and imposed its charges thereon, to the great detriment, first of our own coinage, and second, of all private refining establishments. It is difficult to see how throwing the matter open to all can be considered as promoting a monopoly! But the clause in the bill is a little vague, and the *Tribune* may suspect a job beneath its phrases. In that case, let it be so amended as to remove suspicion.

The provision making the superintendent of each assay office

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ROSSITER W. RAYMOND, Ph. D., Editor,

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The Maintenance of Roadways.

BOTH in the present and in the last number of this journal, we have presented facts and considerations bearing upon the subject of roads and pavements. In continuation of the discussion, we shall briefly give further data, which will assist our readers in forming conclusions of their own. According to the report of the Metropolitan Board of Works, London, there are in use within twelve miles of Charing Cross, more than forty millions of square yards of broken stone pavements, footing up within the metropolitan limits to over eleven hundred miles in length of street. On some of these streets the amount of vehicular traffic passing both ways during the twelve hours, between eight, A. M. and eight, P. M., of a day in July, 1865, is given as follows:

"At Whitehall, by the Chapel Royal, with a width of roadway of eighty-five feet six inches, there passed 11,793 vehicles; Parliament street, Westminster, with a thirty-nine feet two inches width of carriage-way at point of observation, 9,276 vehicles; at Regent street, south of Princess street, with fifty-two feet carriage-way, 11,343 vehicles; over Westminster bridge, with a fifty-six feet eight inches carriage-way, 11,609 vehicles; and over Piccadilly, west of Half-moon street, 8,220 vehicles."

The cost of maintaining the streets in good order amounts to an average of £250 per mile for those within the metropolitan limits, or about seven cents per square yard. Ninety per cent. of this sum is expended for the broken stone, which is imported from the island of Guernsey, at a cost, delivered in London, of sixteen shillings (four dollars) per ton. It appears that the cost of keeping these pavements in order, under very heavy travel, should not amount to more than three and a half cents per square yard per annum, allowing the cost of the broken stone to be four dollars per ton, and there is no doubt but that the necessary material can be obtained there at a very much less cost. Allowing the difference in first cost between this pavement and wood to be but one dollar per square yard, it is evident that the interest of this difference will more than keep the stone pavement in order perpetually. On the other hand, it is reported that on account of the noiselessness of wooden pavements, the lodgings on the streets in which they were for a limited time employed, rose considerably in price during that period.

Wood seems to be indicated, therefore, for streets occupied with residences, and not exposed to the heaviest traffic. The cost of laying and repairing wooden pavements in New York, at the present time, is monstrous; and the item of repairs is made much heavier (in amount of work, quite aside from the extortionate prices at which the work is charged) by the imperfect manner in which the foundations are prepared. The cost of the Nicholson pavement in New York is five dollars per square yard. That of the broken stone pavement, (called Macadam or Telford) with fourteen inches of broken trap rock, thoroughly consolidated by the heavy steam-roller, would be, it is said, but three dollars and fifty cents per square yard. In five years from the time a wooden pavement is laid, in the present careless manner, upon a street subjected to heavy traffic, it will have become so much worn and sunken in patches as to require relaying; and this operation, with a beautiful regularity, costs five dollars per square yard, like the first. Hence, the cost of repairing a wooden pavement, at present rates and conditions, is one dollar per square yard per annum. The Macadam pavement can be maintained in perpetuity for less than one-tenth of this amount, and, when properly attended to, improves, rather than deteriorates, within that time.

It is evident that if the advantages of wood are to be decided in its favor, for any streets or roads, anywhere, its present huge disadvantages in the direction of expense must be largely reduced. High royalties, swindling contracts, and the neglect of properly prepared foundations, are the sources of loss which can and should be stopped.

Mining in Utah.

WE are much gratified to have our attention drawn almost every day to new evidences of the immense benefit derived by our western mining regions from the Pacific railroad.

The lead and silver mines of Utah Territory have been worked off and on for about ten years, but the great distances between the mines and a market have prevented the successful establishment of mining industry in those regions, where the base metals, such as lead and copper, form the bulk of the treasure offered by nature. The Rush valley and the Cottonwood district mines have been most prominently before the public, and several years ago already attempts were made at smelting on the spot in the latter district, but they failed from causes similar to those preventing many of the Nevada, Idaho and Montana districts from becoming regular contributors to the bullion production of the country. Since the railroad has been in operation, all this is changed for the better. Shipments of both metals and ore go over the road to the East and West continually, and the low grade ores, the real foundation of all mining enterprises, are now extracted at a profit.

A correspondent from the Rush valley mines gives a hopeful account of affairs in that region. The mines are located forty miles S.W. from Salt Lake City, and great activity is diplayed in working them this season. The best mine opened is the SILVER KING, worked by Gen. P. E. CONNER, of California. The vein is opened to a depth of fifty feet and is yielding large quantities of ore. It is four feet wide and consists of lead and silver ores, the former predominating. The Great Basin, Great Central, Hidden Treasure and Susquehanna are mines producing similar ores in encouraging abundance.

These mines will be, during this season, the basis of extensive shipments of ores. They are located only twelve miles from the Great Salt Lake, where a landing is being established. From here the ores are to be taken to Corienne, on the Central Pacific R. R., by the steamer KATE CONNER, and thence to Eastern or Western smelting works, according to the predilections of the owners. Many tons of these ores are reported to contain between fifty and sixty per cent. of lead and a considerable amount of silver. If so, they will undoubtedly bear the cost of transportation to far-off smelting works and leave a profit; but it seems to us, that a far larger profit might be secured for the mine owners by the erection of moderately sized smelting works, of the blast-furnace style, at some point in Utah, such as Weber cañon, where excellent coal is plenty and water power abundant, and where Chinese labor may be secured for the furnaces. A vast proportion of the freight might thus be saved, and if we mistake not, also a large proportion of the smelting expenses, which are extravagant, both in the East and on the Pacific coast, on account of high coal and labor.

The Gold Yield (1850-1869) of Nova Scotia.

By A. HEATHERINGTON.

UNDER the above title, Mr. HEATHERINGTON has published, in Halifax, very full and comprehensive tabular statistics in relation to the Nova Scotia gold mining industry, comprising the results since the first opening of the mines in 1860, to the close of 1869. The figures are compiled from corrected official records, and are undoubtedly the most trustworthy ever presented to the public. The yield of Gold, aggregate number of miners for the year, and daily average number for the year of three hundred and twelve working days; quartz raised and crushed, total and per man daily; the number of mills driven by steam and water, and the number of mines worked are given for each of the twelve classified districts, and for the few unclassified ones. Next follows a general summary of the annual yield of all the districrs from 1860 to 1869, and of the quantities of gold obtained in each district during the nine years. It appears from these tables that the total yield of the Nova Scotia gold mines, including 1869, has been £717,800. This seems not a large amount at first glance, but the comparisons which Mr. HEATHERINGTON makes with the yield of the Victoria mines in Australia, both as to the yield per ton of quartz and the proportion per miner employed, speak encouragingly in favor of the Nova Scotia gold field. The tables convey a vast deal of useful information both to the capitalist and the professional engineer, and are well worth an attentive perusal.

Mint Reform.

THE important report of Mr. JOHN JAY KNOX, Deputy Comptroller of the Treasury, published in the JOURNAL a few weeks ago, has excited considerable discussion in our newspapers. Some of our dailies have objected violently to parts of the report and the bill accompanying it, while others, and we are glad to see, the most influential and far-sighted ones, endorse both the report and the bill as adequate to the requirements of our mint system.

In another part of this number we reprint an editorial from the *New York Evening Post* on this subject. We may say, that it fairly gives expression to our own views on the contemplated reform, and we therefore draw the attention of our readers to the article.

American Fire Brick.

IN our issue of May 22, 1869, under the head of "Blast Furnaces," was instituted a comparison between the fire-brick of domestic and those of foreign manufacture, referring notably to the brand of the Mount Savage production. In our issue of to-day our readers will remark a change in the form of the advertisement of the Mount Savage Fire Brick, from which it appears that the Consolidation Coal Company has remitted its interest in this special production to the former proprietors of the Mount Savage works, under the title of the "Mount Savage Fire Brick and Mining Company," the great increase of the business of the Consolidation Coal Company, augmented as it has been by the absorption of the coal interests of the Cumberland Coal and Iron Company, having warranted, if not demanded, such a change.

In substituting a new advertisement for that which has so long occupied a place in our columns, we were anxious to know how far the high estimate we had placed before our readers in May, 1869, of the quality of the Mount Savage fire-brick, would be sustained under the new organization. Accordingly we called upon the president of the company, who showed us a letter from the superintendent of one of the most prominent iron manufacturing works in the country, which had been written without solicitation, after a recent "fiery trial" of Mount Savage fire-brick, of which we solicited a copy, for the purpose of verifying our own judgment, and at the same time promoting the interests of home manufactures in competition with foreign importations. The letter reads as follows:

BAY STATE IRON WORKS,
SOUTH BOSTON, June 1, 1870.

JAMES S, MACKIE, Esq., President Mount Savage Fire Brick and Mining Company, No. 711 Broadway, New York:

DEAR SIR—I have used your Mount Savage fire brick at different periods for twenty-five years, for puddling furnaces and for heating furnaces, and found them superior to any other brick for standing high temperatures. I am using them in a Siemans-Martin furnace, for making steel on the open hearth, both for the walls, ports, and arches, and can state that they give perfect satisfaction for that purpose. They do not break and crumble out from the arch, like the Dinas bricks, and are much more refractory to resist high temperatures. I have treated them with the best bricks I could get, the Dinas bricks included, by placing them on the bottom, in front the ports of a Siemans-Martin steel furnace, and kept them there until all the others melted, and they were taken out in good shape, with the marks of the brand still visible. I have no hesitation in saying that I consider them superior to any bricks I have seen, in this country or in England, for resisting high temperatures.

Yours, faithfully, RALPH CROOKER,
Superintendent Bay State Iron Works.

A Diamond Survey Called For.

TO THE EDITOR—Sir: I have been residing on the Pacific Coast since 1850, am familiar with different kinds of mines and mining, have been a practical operator and a constant observer of minerals, mines, and the accompanying signs, for the last thirty-five years, and have, during that time, seen most of the mines in the Middle States, sufficiently to satisfy myself of the untold wealth of the mineral deposits, especially of the section of country along the Rocky Mountains, and west of that range, traversing the American continent. It is useless to speak of any one or two of the precious metals, for they all seem to be present in the most lavish abundance. I did not, however, intend to write an article on mines and minerals generally, but to speak more particularly of diamonds, and the almost certainty of their abundance on the Pacific Coast, or in this interior country. Were I able, it should be my aim to visit the diamond mines in Brazil, to become familiar with the "blossom," or the accompanying signs in the diamond mines, and I have been tempted to lay the matter before the government for their consideration. Believing as I do, in fact knowing that there are accompanying signs with every mineral with which I am familiar, I am led to believe that there are signs that would point out to us our diamond fields. Every miner who has any observation knows that there is a sign, a "blossom," for gold, silver, lead, copper, iron, cinnabar, and coal, signs often which cannot be described by them, but unerring guides for the prospector, not only in rocks, pebbles, slates, soils, and shapes of mountains, and country rocks, but even in the class and peculiar color of the leaves of vegetation, as may be seen near the New Almaden quicksilver mines. Then, why not let some observing miner visit the diamond region? and why should not the government send some suitable person, and pay his expenses, who will practically examine our own mining country? A scientific examination, a report, would be of little value to prospectors; what is wanting is a practical examination by a practical man, who will put his observations and theory into practice by specially examining our mineral fields after his return. How well do I remember that I passed over some of our richest silver belts; yes, over the "float" silver ore, while on my way to California in 1850, and though familiar with what the books teach, was yet totally ignorant that I was trampling under foot, and inhaling in the very dust the richest silver ore. Let us have light. A. D. ROCK.

[We do not agree with our correspondent, for several reasons. In the first place, the "blossom" of metallic deposits is only a locally unerring sign. Prospectors are perpetually led into error by supposing the signs which indicate a particular mineral in one district to be equally true for another. In the third place, their geological relations have been pretty thoroughly studied already, and the conditions existing in Brazil, the Southern States, and elsewhere, in association with the occurrence of diamonds, have not yet been found on the Pacific Coast or in the Inland Basin. When they are discovered, by the system of scientific exploration which our correspondent despises, there will be no lack of scientific observers to draw the necessary conclusions. Finally, the only diamond mines in the world are placer-washings; and the immense placer-mining industry of the West will discover diamonds, if they exist there, sooner than any number of diamond-surveys.—ED.]

CONTINUED FROM PAGE 406.

also its treasurer, and putting him under sufficient bonds for the management of its funds, seems far better to us than the nominal connection of the Assistant Treasurer of the United States with the assay offices. This officer, busy with larger details, is not able to check the vouchers of the assay office, and the virtual control of its funds passes to the superintendent, whose checks are drawn on the sub-treasury. In other words, the two functionaries divide and weaken the responsibility, without affording any additional check upon expenditures, or test of accuracy in accounts. The superintendent can easily discharge the duties of treasurer. He is not overburdened with work; and it would be a pity to create a new office in a department where one already existing is so nearly a sinecure.

Another good thing in this report of Mr. KNOX is his evident leaning towards a perfectly metrical coinage. Holding fast to the proper principle of a uniform standard of fineness, and coin values not too far below the market values of bullion, he shows how nearly metrical is our present coinage, how easy and imperceptible will be the changes required to make it perfectly so, and, by implication at least, recommends their adoption, though this is a matter apart from the main object of this bill.

The different features of this plan have been submitted, we are informed, to many of the principal experts of the country, and their suggestions have led to its careful revision and modification, so that in its present form it may be said to contain the united wisdom of our best authorities. When we add that some of the particulars which the *Tribune* finds obnoxious have already been engrafted, as the result of long experience, on the mint system of England, we present what we cannot but consider a strong case in favor of the new bill.—*N. Y. Eve. Post.*

MINING SUMMARY.

Nevada.

SALE OF THE EBERHARDT MINE.

The White Pine *News*, of June 8th, says: "The sale of the Eberhardt and other mines, we are assured by private and good authority, has been fully consummated. The English company who have bought the properties will doubtless take possession in a few days, when we may look for an active and extensive working of these first-class mines."

THE COMSTOCK AND OTHER IMPORTANT MINES.

The San Francisco *Commercial Herald*, June 10, thus reviews the progress of events at the Comstock and White Pine mines, in connection with their stocks in the San Francisco market: "The operations of the Board during the past week have been rather larger than the previous week, owing in a great measure to the heavy sales of Savage, which changed hands to the extent of nearly 2,600 shares on the 7th, and to nearly that number on the day following. Original Hidden Treasure also sold largely. As a general thing, mining stocks show no improvement, some continuing to hold their own from opening rates of the week, while others are declinining from day to day. From a purely speculative point of view, some agree that this is a good time to invest, but when we look to the prospective production of the various companies, at least on the Comstock lode, the prospect is not so encouraging. We notice that the shipments of bullion from Hamilton (White Pine), through Wells, Fargo & Co.'s Express, for the month of May, aggregate $179,205, of which amount $121,214 was sent West, and $57,991 to the East. From a private source we learn that the bullion product of the White Pine region is much larger than San Franciscans generally have an idea of. What they are now mostly in need of to facilitate shipments abroad is a railroad extending from Hamilton to Elko, a distance of about one hundred miles. This road, it is said, could be constructed in the course of a year, as it can be carried over a level stretch of country the entire distance. This would give facilities for the exportation of ores not before enjoyed, and would greatly enhance the value of mines located in that region.

"CROWN POINT—was in the market to a less extent than the previous week, selling at a slight recession. For the week ending June 3d, 152¼ tons of ore were extracted, valued at $2,289 92, equal to $15 04 per ton. From the annual report of the Secretary we take the following statement, embracing the fiscal year from May 1, 1869, to May 1, 1870:

RECEIPTS.

Bullion	$76,167 45
Premium on bullion	375 81
Assessment No. 17	60,000 00
Assessment No. 18	90,000 00
Assessment No. 19	90,000 00
From Rhode Island Mill	26,770 83
From Mine—Ore hoisting ore for Kentuck and Yellow Jacket Companies, etc.	22,124 70
Sundries	2,616 65
Cash on hand, May 1, 1869	4,679 76
	$410,735 20

DISBURSEMENTS.

Crown Point Mine	$196,428 64
Rhode Island Mill	10,910 94
Reducing ores	59,959 00
Virginia and Truckee Railroad	56,250 00
Local expenses	4,631 00
General Expenses—Gold Hill	15,665 35
Salaries, rents, etc.—San Francisco	8,663 62
Discount and Interest	4,422 18
Taxes	7,858 19
Sundries	6,637 30
Cash on hand, May 1, 1870	39,309 08
	$410,735 20

"There were 5,391½ tons of ore reduced during the year, yielding $76,167 45, showing an average of $14 12½ per ton.

ASSETS.

Cash on hand, May 1, 1870	$37,573 60
Jno. P. Jones (cash at Gold Hill)	1,735 48
Rhode Island Mill	60,000 00
Mine improvements, buildings, etc.	80,000 00
Stock on hand at mine	8,705 21
Stock on hand at mill	9,324 08
Virginia and Truckee Railroad Company	74,103 02
Atlantic and Pacific Telegraph Company	499 20
Ore on hand at mill, 650 tons	8,131 50
	$280,059 09

"Following are the officers of the Crown Point Mining Company: J. D. Fry, A. Hayward, Robert Sherwood, A. K. P. Harmon and H. C. Kibbe, Trustees. J. D. Fry, President; C. E. Elliott, Secretary, and John P. Jones, Superintendent.

"HALE & NORCROSS—met with moderate sales, under a very considerable decline. The ore product for the week ending June 5th amounted to 731½ tons, all from the upper mine, as follows: 175-level, 233½; 300-level, 286½, and 535-level, 211½ tons. At the same time they had 4,832 tons on hand in the dumps. On the 6th inst., $20,021 in bullion was sent forward to the office in this city. On the 5th instant they completed repairs on the shaft, and again resumed work in the lower levels as heretofore. They are now engaged in cross-cutting the vein on the lower level at a point 150 feet north of the shaft, and the Superintendent says the prospects appear to be good for satisfactory developments. A dividend of $7 50 per share is payable since the 10th inst.

"GOULD & CURRY—under lessened sales, continues to decline. During the week ending June 6th, they mined 401 tons, showing an average assay value of $52 30 per ton. On the seventh station, cross-cut No. 1 has been abandoned. Work was resumed in No. 3, to which seven feet were added, and to cross-cut A sixteen feet were added—both drifts running in quartz. The second station incline has been connected with the 100-foot level, and the Superintendent thinks they will get considerable ore from that point. On the 100-level a raise is being made from the fifth floor north, which shows some ore. They have resumed work in the winze on the El Dorado level, which has attained a depth of 62 feet, and shows a little ore. The bullion returns for the month of May aggregate $94,045, against $48,722 in April.

"CHOLLAR-POTOSI—has been well maintained, and the offerings increased toward the close. They extracted 1,200 tons of ore during the week ending June 3d, showing an average assay value, from car samples, of $49 75 per ton. The Belvidere section, at the extreme south end, is being stoped out 26 feet in width, three-fourths of the entire body, it is reported, being a good quality of ore. The shaft from the surface, to connect with the winze coming up from below, came to ore at a depth of 20 feet, and a favorable report is given of this portion of the mine. No change in the Blue Wing section, which promises equally as well for June as it did for May. A dividend of $1 per share is payable on and after the 10th.

"BELCHER—changed hands to a much larger extent than usual, at a smart decline. On the 5th inst., $13,031 in bullion was forwarded to this city. The ore-seam cut 56 feet above the 262-level does not look so well within the past week: instead of being compact, it is divided into seams, but they may join together and form a body again. In a cross-cut about 130 feet south of the north boundary line, and about 35 feet above the 152-level, some good quartz has made its appearance, and is thought to be a continuation of a body of ore under the north incline, which assays $28 to the ton. They have resumed work on the 730-level. An assessment of $4 per share was levied on the 8th inst.

"KENTUCK—was little inquired for, selling at declining rates. During the week ending June 3d, 195¾ tons of ore were taken from the mine, showing an approximate yield of $3,745 96, equal to $19 21 per ton.

"IMPERIAL—has not advanced. On the 7th inst., the winze was 77 feet in depth, the bottom showing no change. The face of the 1,200 drift is still in porphyry.

"SIERRA NEVADA—sold to a less extent than last week. The bullion yield for the month of May aggregates $14,500.

"OPHIR—shows no advance in the face of a delinquent assessment. Mail dates of the 7th state that 'the Atchison company has commenced suit against the Ophir company, to quiet title to 500 feet on the north end of the Ophir location.'

"ORIGINAL HIDDEN TREASURE (W. P.)—disburses a dividend of $1 50 per share on and after the 10th.

"THE NORTH STAR (Cal.)—also disburse a dividend of $1 per share on the 10th."

California.

THE NORTH SAN JUAN HYDRAULIC MINES.

A correspondent of the Nevada *Transcript* says that there are only three companies washing on San Juan Hill at present, FOSTER & Co., BEECH & Co. and BOWEN & Co. The Empire Company will commence in a few weeks. The supply of water is diminishing. The rumors that the Eureka Lake Water Company and the North Bloomfield Mining and Ditch Company were negotiating for a consolidation are probably groundless, although such a thing is to be desired. At Sebastopol, the American Company stopped washing four weeks ago, owing to the high price charged for water. They have now determined upon building a ditch of their own. The same of 29th says the ditch will start above Cañon creek, and pass through the mining region in the neighborhood of Badger hill, Cherokee, North San Juan to Manzanita hill, ending in the American Company's claims. Its estimate cost is $150,000.

EUREKA MINE.

The Grass Valley *Union*, May 25th, says:—Yesterday was the regular semi-monthly melting day, and gold to the value of $28,500 was put into bars. This was from a run of twelve days of the mill, and is independent of sulphuret workings. The Eureka has more than paid its $2,000 per day for the last twelve days.

ITEMS FROM THE RIDGE.

The same paper of 26th, says: The English Company, on Buckeye hill, Sweetland, cleaned up $15,000, the proceeds of a short run. The Buck and Breck claims, owned by a Chinese company, have sunk all the money for the purpose of extending their operations. The claim is nearly worked up to their line. The company is negotiating for the purchase of one-half of a mile of gravel claims on Shady creek.

ALPINE COUNTY.

The Alpine *Chronicle* says: Since the purchase of the Buckeye No. 2 mine by the Exchequer Company, and the successful working of its ore, the mines in the cañon have been attracting unusual attention. There are several claims which are known to be good. Most of the work now done here is paid for by New York and London capitalists. The claims held by San Franciscans are allowed to remain unworked.

According to the *Miner*, May 21st, the working of the ore from the M. C. Tunnel, No. 3, at Reno mill, gave a return of $44 74. This is ore out of the tunnel 100 feet from the east wall, where the main deposit is known to lie.

GOLD AND SILVER DISCOVERED IN ALAMEDA COUNTY.

This latest sensation in the way of mineral discoveries is in Alameda county, almost directly opposite San Francisco. They are thus spoken of by a correspondent of the Alameda *Encinal* of May 28, who is said to be a man of experience and is reliable: Our Brooklyn neighbors are immensely excited over the discovery of a mineral lode, which is said to assay $200 to the ton in gold and silver. It is located a short distance north of the termination of Fruit Vale avenue, among the cañons of the foot-hills. Some of the rock which we have seen is composed of talcose slate, in places sparingly intermixed with quartz and strontian. The entire length of some of these gulches is flanked by this formation, while neighboring hills are made up of serpentine to the south, sandstone and conglomerate to the north. It is no new thing for gold and silver excitements to originate about this locality. For years past everybody has known that the gravel and sand along the gulches running from the hills, prospect sparingly of the metal, but as yet it has never been obtained in quantity to pay for the tools which have been used in hunting for it. Five years ago, we met a young man who was going to bet his whole pile—which unfortunately did not amount to much—on a lode which he discovered near the above locality, the rock of which yielded, by assay in San Francisco, $150 per ton. We incurred his maledictions by asserting that no such rock was dug from those hills. He spent much valuable time in pursuing the wild cat, and ultimately forsook the locality of his golden dreams. For two years past parties have been prospecting more or less over those hills, which assumed an enormous value, on the strength of $60 and $70 in gold, which were reputed to have been obtained by assay of the rock in San Francisco. Some parties went so far as to give $20,000 for a tract which the owner would have gladly sold for less than half the money; and they employed an experienced miner to sink one ore more shafts, the rock of which was said to have yielded $80 per ton. Some of this same rock we submitted to a careful analytical test, and could never find the color in it. The old miner left the premises in disgust, but the owners still cling to their golden delirium. And so it may prove in the present case. We have probably traveled over those hills, and inspected their mineral character, as much as any living man, and we have yet to see a regular deposit of any metal, beyond the iron sulphurets, from any of the numerous shafts which have been sunk.

RICH STIKE OF GRAVEL IN PLACER COUNTY.

A correspondent writing from Michigan Bluff, in the eastern part of Placer county, to the Auburn *Stars and Stripes* says: The divide which leads from Michigan Bluff to the Forks House lies between two deep cañons, El Dorado cañon on the east and Volcano cañon on the west. A large number of gravel claims have been located for years on this divide, started in on the El Dorado cañon side. The claims paid well near the rim rock, but, after running in tunnels for a considerable distance, the diggings were spotted and paid indifferently. A good many claims have been abandoned, tunnels that cost thousands have been deserted. During the past few years only about a dozen men have been prosecuting mining where, formerly, there were several hundreds. Mr. WEISKE owns a claim, about two miles above this town, which he has worked for years with such poor success that he has run in debt over six thousand dollars, using the strictest economy, persevering under great difficulties and every discouragement, but *labor omnia vincit*. Last fall he struck rich pay in the back part of his tunnel, which runs into the divide nearly a mile. He has paid all of his debts, and about four weeks ago started for Germany. Since he left, his claim has yielded $7,000 in hard cash, over expenses, and a little over $4,000 last week—one hundred and fourteen ounces being taken out of one pan. It is the opinion of experienced miners in this section that this tunnel has struck the main lead. This is, no doubt the lead which commences at the Dardanelles, passes through Forest Hill, Bath, and extends up the divide to Damascus. The gravel, cement, etc., is all of the same character. It is eight miles from Michigan Bluff to the Forks House, and the whole eight miles will prove rich in gold-bearing earth. The Franklin claims, adjoining Weiske, has also struck the same rich lead. All miners have to do now is to extend their tunnels. Mr. BOWEN, after a good deal of discouragement, which required great energy and enterprise to overcome, has struck very rich pay in his claim.

Colorado.

BULLION SHIPMENTS TO NEW YORK AND PHILADILPHIA.

The Georgetown *Miner*, June 2, says: R. O. OLD, Esq., shipped yesterday to New York a silver brick weighing 134.5 lbs. troy, or 1614 ounces. This silver was .800 fine, and is valued at $1049 30 coin. It was produced from second-class "Terrible" ore, treated at STEWART'S reduction works. The Brown Silver Mining Company shipped on Tuesday last, another of those "masses of silver" for the production of which their smelting works at Brownsville have obtained such a celebrity. The weight of this last candidate for mint honors was 325 lbs. troy, or 3,900 ounces, and its currency value is $5,000. The Baker Silver Mining company shipped to Philadelphia on yesterday's coach, a silver brick weighing 1,003.5 ounces, .648 fine, the product of "Baker" ore treated at the works of the company. The coin value of the brick was $841 57. We are glad to know that the Baker mine is now producing ore of good quality and quite abundant in quantity. We shall look for more bricks from Bakerville.

THE ST. LAWRENCE MINING COMPANY.

The same paper says: Mr. B. HODSKIN, a practical and influentia business man, from Northern New York, has returned to our Territory in the interests of the St. Lawrence Silver Mining Company of Colorado. Last year this gentleman superintended the erection of the building for Reduction Works, and other improvements, upon the company's property, situated west of the Range, including the development of the Silver Wing and Napoleon lodes. Machinery of thirty tons capacity daily, the best that could be procured, is now in transit from New York, and will be delivered at the company's mines as soon as the Range can be crossed with teams. It is intended to have the mill in successful operation within one month from the time the machinery arrives. It is the purpose of the company to erect a Howland patent rotary battery. The mill is to be located near the Sukey Reduction Works, in the neighborhood of Montezuma, eighteen miles west of here. Mr. HODSKIN left Georgetown for Montezuma on Monday, accompanied by Mr. D. SHERMAN and son, and others. Mr. SHERMAN is a stockholder in the St. Lawrence Company, and being a first-class blacksmith, will most likely open a shop at or near Montezuma. We are informed that several levels will soon be started on the Silver Wing and Napoleon veins, and that a night as well as a day force will be employed to run them. This arrangement will insure an abundance of ore by the time the mill shall be ready for operations. If the veins owned by the St. Lawrence Company fail to produce ore enough to keep the mill steadily employed, it will be an easy matter to obtain supplies from the numerous workable lodes in the neighborhood, which are owned by persons who depend upon others for facilities to make their interests profitable.

Canada.

DESTRUCTIVE FIRE ON THE NORTH SHORE—BUILDINGS OF THE THUNDER BAY SILVER MINE DESTROYED.

On the 18th ult. a destructive fire, which lasted about a week, broke out in the woods back of Fort William. It spread over an extent of country supposed to be nearly fifty miles wide, and an indefinite distance northward. The destruction is immense. Whole tracts of land are completely stripped of timber. At the landing near Fort William only one house was burned, but at the Thunder Bay Silver Mine, some six miles distant, not one building has survived the flames, and men, women and children only saved their lives by descending the shaft of the mine, or going into the lake up to their necks. No rain had fallen since the melting of the snow, which was unusually early, and the whole surface of the country was as inflammable as tinder.

A Mountain Railway in Silesia.

THE Hungarian correspondent of the London *Times* has sent to that journal the following interesting account of a cheaply constructed railway in Silesia :

"At a moment when the construction of cheap railways has received a new impulse through the Fairlie system, your readers may be interested in hearing of a new invention in this direction by a Hungarian gentleman, Mr. LOPRESTI, which was tested a few days ago, and with complete success.

"There has been, indeed, for the last two years a trial line, after this system, in use on the property of Archduke Albrecht, near Teschen, in Silesia; but, being only about two thousand yards in length, it gave no measure of the applicability of the system on a larger scale.

"In the north-eastern part of Hungary the Crown has the extensive domain of Diriggöi, occupying a great portion of the slopes and valleys of the Pike mountain chain, one of the three detached ranges of mountains in the heart of Hungary. The chief wealth of this domain consists of the fine oak and beech woods, which have been, however, hitherto so badly managed that they not only yielded no revenue, but scarcely paid their cost. Since the Hungarian Ministry was constituted, Mr. LONYAY, the Minister of Finance, has directed his special attention to these Crown domains. One of his creations on this field is the extension of the primitive iron works of Diriggöi into a large establishment for the manufacture of refined iron. Partly to supply fuel for this, and partly to facilitate the transport of the wood into the neighboring country of the Theiss, a line of about five English miles in length has been constructed on one of the mountain valleys to the top of the ridge. The tracks were so wretched and steep, and the line so much curved, that it was quite impossible to bring down the wood by ordinary means without enormous expense. So on this point the new system has been tried.

"The line requires no permanent way at all. Square beams of oak, eight inches high and fourteen inches broad, are laid on the ground, and only at rare intervals, where the great unevenness of the ground absolutely requires it, cross-sleepers are laid under it. Each of these longitudinal beams has a length of eighteen feet; on the two edges of the beams are the rails, which are only two inches broad, and so thin that they weigh but one pound per foot. These beams and rails may be taken up at any moment, and the railway thus re-laid whenever it is required. The trucks run on two pairs of wheels eight inches in diameter; the bodies of the trucks are about three times the width of the rails, and are placed so low on the wheels that they have just room to pass over them. This, in itself, bringing the weight down so near the line, is a great guarantee against any accident arising from the narrowness of the gauge and the severity of the curves. Besides this, there is a double brake on each truck, the ordinary brake, and then, before and behind, a couple of side wheels running outside the gauge, which may be pressed against the sides. All these precautions are taken to insure against any overturning, for on parts of the line about half of the truck is hanging over precipices, and running at the rate of some twenty to thirty miles an hour down hill.

"The top of the mountain ridge is some seven hundred feet above the level of the valley, where the works are; for about one-third of the distance of five English miles the gradient is but slight—1 or 2 in 100; but further, there are gradients of not less than 1 in 16, and that for considerable distances. Even bolder are the curves. The line winds along the sides of hills so small that there are curves of a radius of twelve yards, and those of twenty to twenty-two yards radius follow each other in quick succession. The trucks are taken up empty by horses, and when filled are allowed to come down by their own impetus. The arrangement of the weight and the system of brakes is so perfect, that the train may be stopped when on a gradient of 1 in 7 and going at the rate of twenty or thirty miles an hour, within six to eight yards. The five miles cost £2000, and after the experience now gained, the work may be done for about £200 per mile.

"As you may gather from the foregoing description, the object of the line in the present instance is traffic one way. And already, in this respect, it is invaluable in a country like Hungary, which possesses great mineral wealth and forests of inestimable value, which will become accessible at a small cost by these means, whereas otherwise they would be either altogether lost, or, at least, imperfectly got at.

"According to the calculations made since the line was opened, the square measure of wood, the transport of which cost from four to five florins, and at times could not even be transported for that sum, can now be sent down for less than one-half, and in this the sinking fund for the money invested is included. As soon as the woods along the line are cut down the line will be taken up and relaid elsewhere.

"But the invention is but half complete, for the inventor has likewise designed a locomotive for his line, which will dispense with the application of horse power, and will give the invention its full value. He has not had the means of constructing his locomotive, but now a company is to be formed, which will carry out on a large scale what answers as well on a small one. Incomplete as the system is up to the present moment, it is already of great value to Hungary. There are miles and miles of mountain forest which decay for want of means of transport, and which may be utilized by this system. The direction of the State domains has already decided to apply the system to several other domains, and others will no doubt follow. But the utility of this new system is not confined to mountain districts. There are those immense Hungarian alluvial plains, where for miles and miles not a trace of stone is found, and where an ordinary road in some cases costs as much as an ordinary railway, and is then not of much use in autumn and spring. So desperate is the case that in some instances people have been driven to adopt the so-called clinker, or paved brick road. The laying down of lines on the Lopresti system would almost amount to the same sum as for the transport of the road metal for the regular road."

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To Plumbers and Masons.—Notice is hereby given to plumbers and masons holding licenses from the late Croton Aqueduct Board that, from and after this date, no permits for tapping water-pipes or for making connections with sewers or drains will be issued unless new bonds are filed with this department.

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jun21:4t Commissioner of Public Works.

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U. S. COMMISSIONER OF MINING STATISTICS.

CONTENTS:

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PART I.—Observations of the present condition of the mining industry :

SECTION I.—*Notes on California :*

Chapter I.—The new Almaden mines.
II.—The Mother Lode of California.
III.—The quartz and placer mines o Nevada County.
IV.—Giant powder and common powder.

II. *Notes on Nevada :*

V.—Present condition and prospects of the Comstock mines.
VI.—Ormsby, Washoe, and Churchil Counties.
VII.—Lander County.
VIII.—Nye County.
IX.—Lincoln County.
X.—EsmeraldaCounty.
XI.—Humboldt County.

SECTION III.—*Notes on Montana :*

Chapter XII.—General geological features.
XIII.—Population, property, railroad, etc.
XIV.—Placer mines.
XV.—Quartz mines.
XVI.—Operations of the United States law.

SECTION IV.—*Notes on Idaho :*

Chapter XVII.—Report of Mr. Ashburner
XVIII.—The War Eagle tunnel.
XIX.—Bullion product.

SECTION V.—*Notes on other mining fields :*

Chapter XX.—Arizona.
XXI.—Utah.
XXII.—The Isthmus of Panama.

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XXVII.—The code of France.
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XXIX.—Mining law of England.
XXX.—Mining regulations of Australia.
XXXI.—Mining laws of Canada.
XXXII.—Conclusions.

SECTION VII.—*Mining Education :*

Chapter XXXIII.—Means of disseminating information with regard to mining and metallurgy; the National School of mines.

SECTION VII.—*Mining Education—Continued.*

Chapter XXXIV.—The Freiberg School of Mines.
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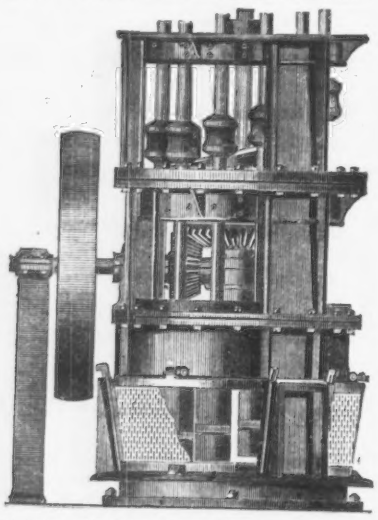

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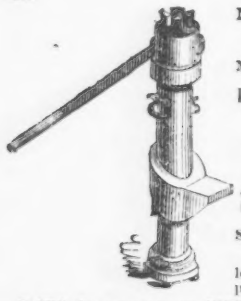

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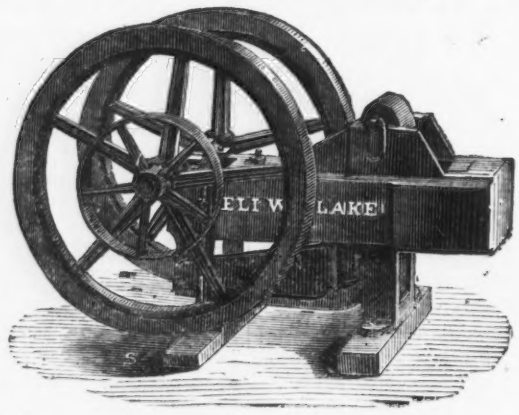

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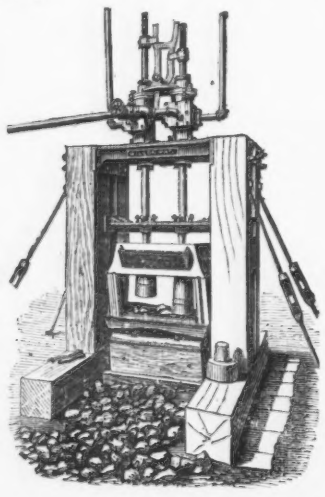

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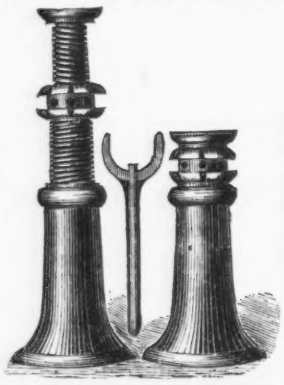

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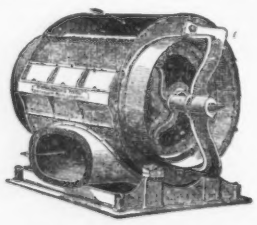

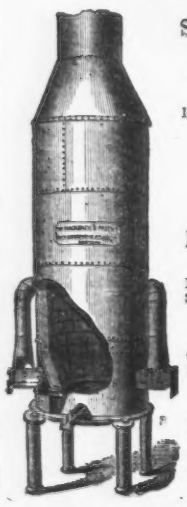

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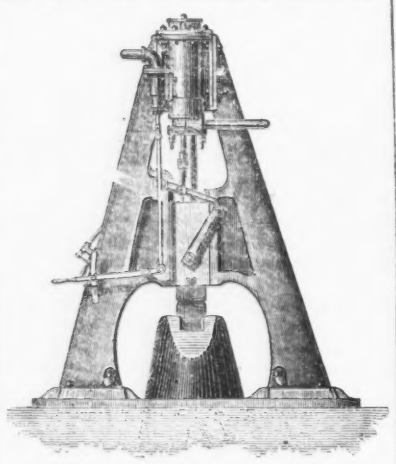

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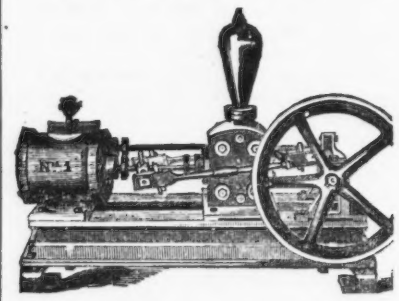

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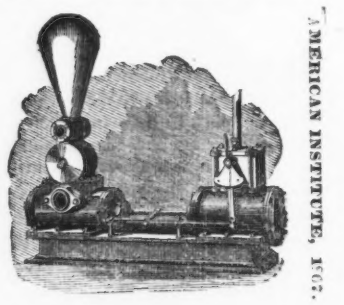

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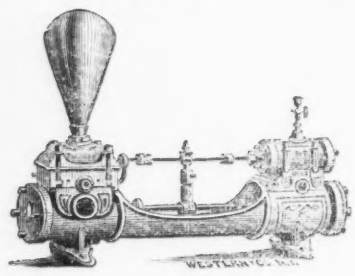

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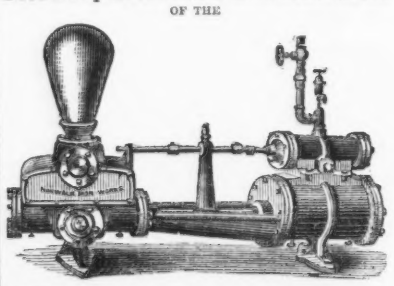

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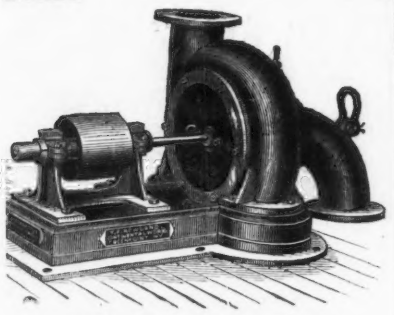

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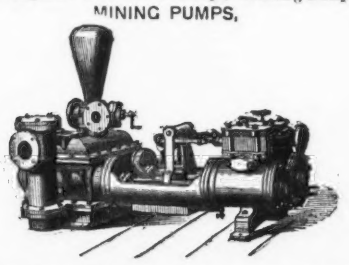

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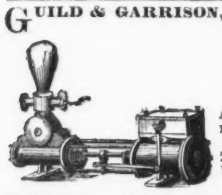

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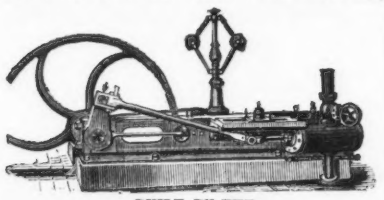

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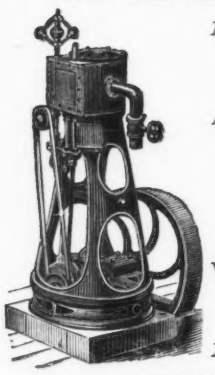

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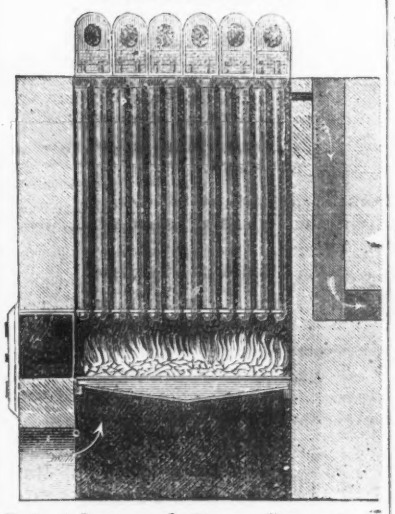

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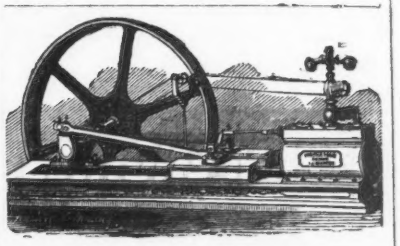

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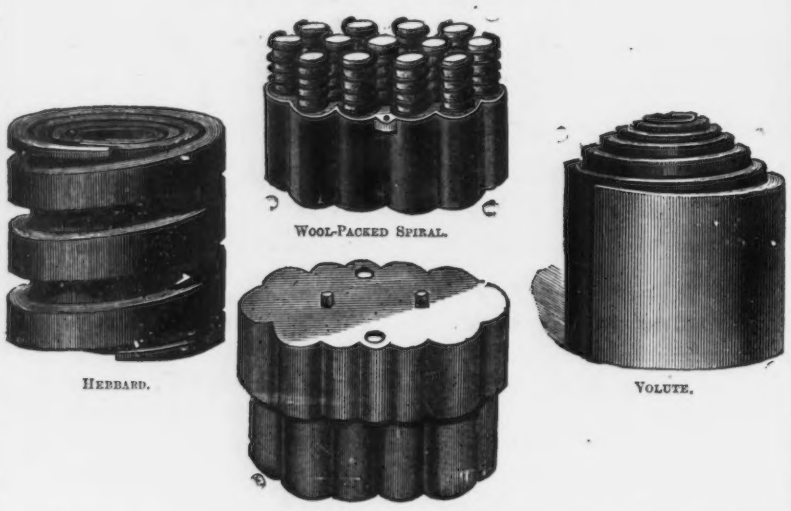

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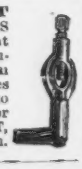

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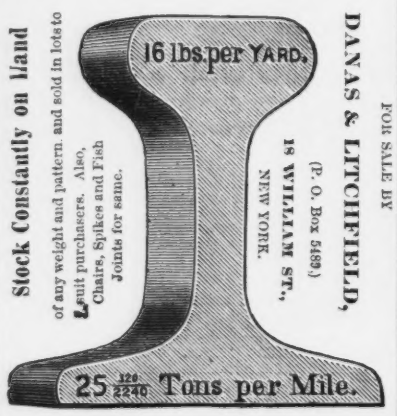
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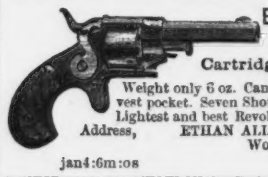

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